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TRANSACTIONS

OF THE

AMERICAN ASSOCIATION

OF

J. M. Baldy '93

OBSTETRICIANS AND GYNECOLOGISTS.

VOL. II.

FOR THE YEAR 1889.

PHILADELPHIA:
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1889.

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AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

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NOTE.

THE Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

WILLIAM WARREN POTTER, *Secretary*,
281 FRANKLIN STREET, BUFFALO.

[MINUTES and discussions reported stenographically by WILLIAM H. THORNTON, M.D., Buffalo, N. Y.]

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LIST OF ILLUSTRATIONS.

PAGE.

Rectification of face presentations. (Rollin L. Banta.)
Figs. 1–3. Diagrams of inlet and outlet of pelvis . . . 46
Fig. 4. Diagram showing sacro-cotyloid diameters and sacro-cotyloid spaces 47

Flap-splitting in perineorrhaphy. (X. O. Werder.)
Fig. 1. Voss's method 55
Figs. 2, 3. Simpson's method (incomplete rupture of perineum) 57
Figs. 4, 5. Operation for complete laceration of the perineum . 57
Fig. 6. Tait's old method (complete laceration of perineum) . 61
Fig. 7. Tait's new operation for incomplete laceration of perineum 63
Fig. 8. Method of inserting sutures 65
Fig. 9. Tait's new operation for complete rupture of perineum . 66
Fig. 10. Diagram showing lines of incision 67
Fig. 11. Diagram showing flaps raised and sutures inserted ready for tying 68

The necessity of recognizing three planes in the obstetric pelvis. (William W. Seymour.)
Fig. 1. Diagram showing planes of the pelvis 79
Fig. 2. Diagram showing plane of the arch 83
Figs. 3, 4. Diagram showing plane of rotation 86

Vaginal hysterectomy. (E. E. Montgomery.)
Fig. 1. Forceps 148
Fig. 2. Clamp 148
Clamp. (W. H. Wathen) 154
Clamp. (R. B. Hall) 164

Functions of the round ligaments. (J. H. Kellogg.)
Fig. 1. Tracing, showing effect of corset in displacing pelvic organs 272
Fig. 2. Tracing, showing curves produced by acts of coughing with and without the corset 272

LIST OF PLATES.

PAGE

The necessity of recognizing three planes in the obstetric pelvis. (W. W. Seymour, M.D.)

Fig. 2 (Plate I., *Savage*). Showing the perineal septum *facing* 82

Fig. 1 (Plate II., *Savage*). Showing the two layers of the superficial fascia . . . . . *facing* 82

Fig. 2 (Plate II., *Savage*). Showing the boundaries between the anterior and posterior perineal triangles . . . *facing* 82

Successful removal of a fibroma of the right ovary during pregnancy. (J. H. Carstens, M.D.)

Tumor after being in alcohol four weeks . . . *facing* 152

CONTENTS.

	PAGE
Constitution	xi
By-laws	xiii
Officers for 1890	xvii
List of Honorary Fellows	xviii
List of Corresponding Fellows	xviii
List of Ordinary Fellows	xix
Minutes of the Second Annual Meeting	xxvii

The President's Annual Address. By William Henry Taylor, M.D.	1
Congenital Sinus of the Urachus; Abdominal Incision. Recovery; with Remarks. By A. Vander Veer, M.D.	7
A Case of Extra-uterine Pregnancy. Operation; Recovery. By L. S. McMurtry, M.D.	9
Treatment of the Ruptured Parturient Uterus, with report of Two Cases. By Charles A. L. Reed, M.D.	25
Two Cases of Intra-uterine Amputation of the Forearm. By Joseph Price, M.D.	41
Rectification of Face Presentations. By Rollin L. Banta, M.D.	45
Flap-splitting in Perineorrhaphy, with Special Reference to Tait's Operation. By X. O. Werder, M.D.	54
The Necessity of Recognizing Three Planes in the Obstetric Pelvis. By William Wotkyns Seymour, M.D.	78
How the Refinements of Abdominal Surgery have Influenced General Surgery. By David Barrow, M.D.	92
Some Accidents and Complications Incident and Subsequent to Abdominal and Pelvic Operations. By Joseph Hoffman, M.D.	100
A Study of the Pathology and Treatment of Intra-pelvic Inflammations. By L. S. McMurtry, M.D.	123
Vaginal Hysterectomy. By E. E. Montgomery, M.D.	140
The Dry Extra-peritoneal Treatment of the Stump in Hysterectomy. By Joseph Price, M.D.	149
Successful Removal of a Fibroma of the Right Ovary during Pregnancy. By J. Henry Carstens, M.D.	151

PAGE

Ligatures and Sutures. What Material shall be Used? By Clinton Cushing, M.D. 168

A Few Considerations on Peritoneal Effusions after Intra-peritoneal Operations. By William H. Myers, M.D. 177

Reasons for Drainage in Ovariotomy. By Hampton E. Hill, M.D. . 188

Umbilical Hemorrhage; its Treatment. By Llewellyn Eliot, M.D. 202

The Management of the Perineum during Labor. By Augustus P. Clarke, M.D. 206

A Report of Ninety Cases of Rapid Dilatation of the Uterine Canal for the Cure of Dysmenorrhea and Sterility. By Franklin Townsend, M.D. 220

A Case of Metremphysema. By Thomas E. McArdle, M.D. . . . 227

Some Points in the Diagnosis of Pyosalpinx. By Rufus B. Hall, M.D. 230

The Forceps as a Means of Rotating the Head in Labor. By Edward J. Ill, M.D. 241

The Need of Specially Trained Men for Abdominal Surgery in Remote Districts. By George R. Dean, M.D. 257

A Remarkable Case of Nymphomania, and its Cure. By William S. Stewart, M.D. 260

A Contribution to the History of Ovariotomy on the Insane. By W. Manton, M.D. 262

New Observations Concerning the Functions of the Round Ligaments. By J. H. Kellogg, M.D. 266

Peculiarities of Abortion from Artificial Causes. By Hamilton A. West, M.D. 275

The Animal Suture; its Place in Surgery. By Henry O. Marcy, M.D. 279

Some Neuroses of the Menopause. By William J. Conklin, M.D. . 301

Sapremia and Septicemia during the Puerperal Period. By William S. Gardner, M.D. 312

The Genu-pectoral or Knee-elbow Position in Obstetrics. By W. H. Wenning, M.D. 331

Discussion on Craniotomy.

I. Is Craniotomy Justifiable on Living Children? By George H. Rohé, M.D. 351

II. Its Alternatives.

Abortion. By William Warren Potter, M.D. . . 356

Premature Labor. By Joseph Hoffman, M.D. . . 358

Forceps and Version. By James P. Boyd, M.D. . . 362

The Cesarean Section. By E. E. Montgomery, M.D. . 366

The Cesarean Section. By A. Vander Veer, M.D. . . 373

Lapara-elytrotomy. By Charles A. L. Reed, M.D. . 376

The Porro Operation. By Joseph Price, M.D. . . 378

Conclusions: A Résumé of the Whole Subject. By William H. Wathen, M.D. 381

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

CONSTITUTION.

I. The name of this Association shall be The American Association of Obstetricians and Gynecologists.

II. Its object shall be the cultivation and promotion of knowledge in whatever relates to Abdominal Surgery, Obstetrics, and Gynecology.

MEMBERS.

III. The members of this Association shall consist of Ordinary Fellows, Honorary Fellows, and Corresponding Fellows.

The Ordinary Fellows shall not exceed one hundred in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Executive Council one month before the first day of meeting by two Fellows, and shall be balloted for at the annual meeting, a list of names having been sent to every Fellow with the notification of the meeting.

A two-thirds vote in the affirmative of all the members present shall be necessary to elect—fifteen Fellows at least being in attendance.

All candidates for active fellowship shall submit to the Executive Council, at least one month before the annual meeting, an original paper relating to Abdominal Surgery, Obstetrics, or Gynecology.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Executive Council.

Their election shall take place in the same manner as that of Ordinary Fellows.

They shall enjoy all the privileges of Ordinary Fellows excepting to vote or hold office, but shall not be required to pay any fee.

CORRESPONDING FELLOWS.

V. The Corresponding Fellows shall be recommended by the Executive Council, and elected by the Association.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, and shall be entitled to a copy of the *Annual Transactions*.

They shall pay an entrance fee of twenty-five dollars.

OFFICERS.

VI. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and five Executive Councillors.

The nomination of all officers shall be made in open session at the business meeting, and the election shall be by ballot.

The officers shall enter upon their duties immediately before the adjournment of the meeting at which they were elected, and shall hold office for one year.

Any vacancy occurring during the recess may be filled temporarily by the Executive Council.

ANNUAL MEETINGS.

VII. The time and place of holding the annual meeting shall be determined by the Association each time before adjournment.

It shall continue for three days, unless otherwise ordered by vote of the Association.

AMENDMENTS.

VIII. This Constitution may be amended by a two-thirds vote of all the Fellows present at the annual meeting, *provided*, that notice of the proposed amendment has been given in writing at the annual meeting next preceding; and, *provided further*, that it shall have been printed in the notification of the meeting at which the vote is to be taken.

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

BY-LAWS.

THE PRESIDING OFFICER.

I. The President, or in his absence one of the Vice-Presidents, shall preside at all meetings, and perform such other duties as ordinarily pertain to the Chair.

The presiding officer shall be *ex-officio* chairman of the Executive Council, but shall vote therein only in case of a tie.

SECRETARY.

II. The Secretary shall attend and keep a record of all meetings of the Association and of the Council, of which latter he shall be *ex-officio* clerk, but shall not be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay the same over to the Treasurer, taking his receipt therefor.

He shall supervise and conduct all correspondence of the Association; he shall superintend the publication of the *Transactions* under the direction of the Executive Council, and shall perform all the ordinary duties of his office.

He shall be the custodian of the seal, books, and records of the Association.

TREASURER.

III. The Treasurer shall receive all moneys from the Secretary, pay all bills, and render an account thereof at the annual meetings, when an Auditing Committee shall be appointed to examine his accounts and records.

EXECUTIVE COUNCIL.

IV. The Executive Council shall meet as often as the interests of the Association may require. The President, or any three members, may call a meeting, and a majority shall constitute a quorum.

It shall have the management of the affairs of the Association, subject to the action of the house at its annual meetings.

It shall have control of the publications of the Association, with full power to accept or reject papers or discussions.

It shall have control of the arrangements for the annual meetings, and shall determine the order of the reading of papers.

It shall constitute a court of inquiry for the investigation of all charges against members for offences involving law or honor, and shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Association shall be as follows:

1. General meeting at 10 o'clock A.M.
   a. Reports of Committees on Scientific Questions.
   b. Reading of Papers and Discussions of the same.
2. The Business Meeting shall be held at half-past eight o'clock P.M. on the second day of the session (unless otherwise ordered by vote), at which only the Fellows of the Association shall be present. The Secretary's Record shall then be read; the Treasurer's Accounts submitted; the Reports of Committees on other than Scientific Subjects offered; and all Miscellaneous Business transacted.

PAPERS.

VI. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary *not later* than one month before the first day of the meeting.

No paper shall be read before the Association that has already been published, or that has been read before any other body.

Not more than thirty minutes shall be occupied in reading any paper before the Association.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary *complete* before the final adjournment of the annual meeting.

QUORUM.

VII. The Fellows present shall constitute a quorum for all business, excepting the admission of new Fellows or acting upon amendments to the Constitution, when not less than fifteen Fellows must be present.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at any meeting, except when introduced by the Executive Council.

FINANCE.

IX. Each Fellow, on admission, shall pay an initiation fee of twenty-five dollars, which shall include his dues for the first year.

Every Fellow shall pay in advance the sum of fifteen dollars annually thereafter.

Any Fellow neglecting to pay his annual dues for two years shall forfeit his membership.

The Secretary shall receive annually a draft from the President drawn on the Treasurer for a sum, to be fixed at each annual meeting, for the services he shall have rendered the Association during the year.

A contingent fund of one hundred dollars shall annually be placed at the disposal of the Secretary for current expenses, to be disbursed by him, and for which he shall present proper vouchers.

ATTENDANCE.

X. Any Fellow who shall neither attend nor present a paper for three consecutive years shall, unless he offer a satisfactory excuse, be dropped from fellowship upon vote of the Executive Council.

RULES.

XI. *Robert's Rules of Order* shall be accepted as a parliamentary guide in the deliberations of the Association.

AMENDMENTS.

XII. These By-Laws may be amended by a two-thirds vote of the Fellows present at any meeting; *provided*, previous notice in writing has been given at the annual meeting next preceding the one at which the vote is to be taken.

OFFICERS FOR 1889–1890.

PRESIDENT.

EDWARD EMMETT MONTGOMERY, Philadelphia.

VICE-PRESIDENTS.

WILLIAM HENCHEL MYERS, Fort Wayne.
ROLLIN LEDRUE BANTA, Buffalo.

SECRETARY.

WILLIAM WARREN POTTER, Buffalo.

TREASURER.

XAVIER OSWALD WERDER, Pittsburg.

EXECUTIVE COUNCIL.

ALBERT VANDER VEER, Albany.
CLINTON CUSHING, San Francisco.
CHARLES ALFRED LEE REED, Cincinnati.
WILLIAM HUTSON WATHEN, Louisville.
HAMPTON EUGENE HILL, Saco, Me.

HONORARY FELLOWS.

ELECTED.

1889. GEORGE GRANVILLE BANTOCK, M.D., London, Eng.
1889. A. H. FREELAND BARBOUR, M.D., Edinburgh, Scot.
1889. A. CHARPENTIER, M.D., Paris, France.
1888. A. CORDES, M.D., Geneva, Switzerland.
1889. J. HALLIDAY CROOM, M.D., F.R.C.S.E., Edinburgh, Scot.
1889. ALEXANDER DUNLAP, M.D., Springfield, Ohio.
1888. ARTHUR W. EDIS, M.D., London, Eng.
1889. FR. EKLUND, M.D., Stockholm, Sweden.
1889. W. A. FREUND, M.D., Strassburg, Germany.
1889. THOMAS KEITH, M.D., London, Eng.
1889. G. LEOPOLD, M.D., Dresden, Germany.
1889. J. NICOLAYSEN, M.D., Kristiania, Norway.
1889. M. SÄNGER, M.D., Leipzig, Germany.
1889. BERNHARD SIGMUND SCHULTZE, M.D., Jena, Germany.
1888. J. GREIG SMITH, F.R.C.S.E., Bristol, Eng.
1888. LAWSON TAIT, F.R.C.S. Eng., M.D., LL.D., Birmingham, Eng.
1888. JOHN WILLIAMS, M.D., F.R.C.P., London, Eng.
1889. F. WINCKEL, Munich, Germany.

CORRESPONDING FELLOW.

1888. ADAM H. WRIGHT, B.A., M.D., Toronto, Ont.

ORDINARY FELLOWS.

Founder.—Allen, Henry Bigelow, M.D. Professor of Obstetrics, College of Medicine, Syracuse University. Baldwinsville, N. Y.

Founder.—Baker, Washington H., M.D. Senior Obstetrician to the Maternity Hospital; Physician to the German Hospital. 1610 Summer Street, Philadelphia, Pa.

Founder.—Banta, Rollin Ledrue, M.D. Consulting Obstetrician to the Sisters of Charity and Maternity Hospitals; President of the Buffalo Obstetrical Society 1887–'88. *Vice-President*, 1890. 358 South Division Street, Buffalo, N. Y.

1889.—Barrow, David, M.D. 196 East High Street, Lexington, Kentucky.

Founder.—Beckwith, Frank E., M.D. Professor of Clinical Gynecology, Yale University; Gynecologist to the New Haven Hospital. 139 Church Street, New Haven, Conn.

Founder.—Boyd, James Peter, A.M., M.D. Professor of Obstetrics and the Diseases of Women and Children, Albany Medical College; Gynecologist to the Albany Hospital; Consulting Obstetric Surgeon to St. Peter's Hospital; Fellow of the British Gynecological Society. 152 Washington Avenue, Albany, N. Y.

1889.—Branham, Joseph H., M.D. Demonstrator of Anatomy, College of Physicians and Surgeons; Visiting Surgeon to Bayview Hospital. 538 North Arlington Avenue, Baltimore, Md.

1889.—Burns, Bernard, M.D. Gynecologist to the Mercy Hospital. 35 Federal Street, Allegheny City, Pa.

Founder.—Carstens, J. Henry, M.D. Professor of Obstetrics and Clinical Gynecology, Detroit College of Medicine; Gynecologist to Harper Hospital; Attending Physician to the Woman's Hospital; Obstetrician to the House of Providence. *Vice-President*, 1888–'89. 21 Macomb Street, Detroit, Michigan.

Founder.—Carson, Norman Bruce, M.D. Surgeon to the St. Louis Mullanphy Hospital; Surgeon to the Augusta Free Hospital; Surgeon to St. Vincent's Insane Hospital; Consulting Surgeon to the City Hospital; Adjunct Professor of Surgery, St. Louis Medical College. 209 North Jefferson Avenue, St. Louis, Mo.

Founder.—Clarke, Augustus Peck, A.M., M.D. 693 Main Street, Cambridge, Mass.

1889.—Conklin, William Judkins, A.M., M.D. Visiting Surgeon to St. Elizabeth's Hospital. Dayton, Ohio.

Founder.—Cushing, Clinton, M.D. Professor of Gynecology in Cooper Medical College. *Executive Council*, 1888–'90. 636 Sutter Street, San Francisco, Cal.

1889.—Davis, W. E. B., M.D. Secretary of the Southern Surgical and Gynecological Association, 1888–'90. 210 Fourth Avenue, Birmingham, Ala.

1889.—Dean, George R., A.B., M.D. 6 South Church Street, Spartanburg, S. C.

1889.—Douglas, Richard, M.D. Fellow of the British Gynecological Society; Member of the Southern Surgical and Gynecological Association. 110 Spruce Street, Nashville, Tenn.

Founder.—Eliot, Llewellyn, M.D. Surgeon to the Eastern Dispensary; Attending Physician to St. Ann's Infant Asylum. 1726 P Street, N. W., Washington, D. C.

1889.—Gardner, William Sisson, M.D. Lecturer on Obstetrics in the College of Physicians and Surgeons; Attending Physician to the Maryland Lying-in Asylum. 410 Hanover Street, Baltimore, Md.

Founder.—Glasgow, Frank A., A.B., M.D. In charge of the Female Medical, Children's Medical, and the Gynecological Departments of the St. Louis Mullanphy Hospital; Lecturer on Clinical Gynecology in the St. Louis Medical College; Physician and Pathologist to the Augusta Free Hospital for Children; Consultant to the St. Louis (city) Female Hospital. 3016 Glasgow Place, St. Louis, Mo.

1889.—Hall, Rufus Bartlett, M.D. Professor of Gynecology in the Cincinnati Polyclinic; Clinical Lecturer on Gynecology in the Miami Medical College. 154 West Eighth Street, Cincinnati, Ohio.

Founder.—Hill, Hampton Eugene, M.D. *Executive Council*, 1890. Saco, Maine.

1889.—Hoffman, Joseph, B.A., M.D. 126 West Diamond Street, Philadelphia, Pa.

Founder.—Ill, Edward Joseph, M.D. Surgeon to the Woman's Hospital; Gynecologist to St. Barnabas' and Physician to the German Hospitals. 1002 Broad Street, Newark, N. J.

Founder.—Jarvis, George Cyprian, M.D. Visiting Physician and Surgeon to the Hartford Hospital. 98 High Street, Hartford, Conn.

Founder.—Kellogg, John Harvey, M.D. Superintendent and Gynecologist of the Sanitarium Hospital; Fellow of the British Gynecological Society. Battle Creek, Michigan.

Founder.—Lothrop, Thomas, M.D. Professor of Obstetrics, Niagara University; Obstetrician to the Maternity Hospital; Physician to St. Francis' Hospital; Consulting Physician to the Hospital of the Sisters of Charity. 153 Delaware Avenue, Buffalo, N. Y.

Founder.—McArdle, Thomas Eugene, A.M., M.D. Professor of Minor Surgery in the National Medical College; Lecturer on Surgical Nursing in the Training School for Nurses. 707 Twelfth Street, N. W., Washington, D. C.

Founder.—McMurtry, Lewis Samuel, A.M., M.D. Formerly Professor of Anatomy in the Kentucky School of Medicine; Ex-President of the Kentucky State Medical Society; Fellow of the Edinburgh Obstetrical Society; Corresponding Member of the Obstetrical Society of Philadelphia, of the Gynecological Society of Boston, and of the New Orleans Medical and Surgical Association. Danville, Kentucky.

Founder.—Manton, Walter Porter, M.D. Visiting Physician to the Woman's Hospital; Consulting Gynecologist to the Michigan State Asylum for the Insane; Fellow of the British Gynecological Society; Fellow of the Royal Microscopical Society. 83 Lafayette Avenue, Detroit, Michigan.

Founder.—Marcy, Henry Orlando, A.M., M.D., LL.D. Surgeon to the Private Hospital for Women, Cambridge; President of the Section of Gynecology, Ninth International Medical Congress; late President of the American Academy of Medicine; Member of the British Medical Association; Member of the Massachusetts Medical Society; Member of the Boston Gynecological Society; Corresponding Member of the Medico-Chirurgical Society of Bologna, Italy. 116 Boylston Street, Boston, Mass.

Founder.—Maxwell, Thomas Jefferson, M.D. Professor of Obstetrics and Gynecology, College of Physicians and Surgeons; Surgeon to St. Joseph's Hospital. 727 North Ninth Street, Keokuk, Iowa.

Founder.—Miller, Aaron Benjamin, M.D. Instructor in Gynecology, Medical Department of Syracuse University; Gynecologist to the House of the Good Shepherd. 121 West Fayette Street, Syracuse, N. Y.

Founder.—Montgomery, Edward Emmett, B.S., M.D. Professor of Didatic and Clinical Gynecology in the Medico-Chirurgical College; Gynecologist to the Medico-Chirurgical Hospital; Obstetrician to the Philadelphia Hospital. *Vice-President*, 1888–'89; *President*, 1890. 1818 Arch Street, Philadelphia, Pa.

Founder.—Moses, Gratz Ashe, M.D. Professor of Obstetrics and Gynecology in the Missouri Medical College; formerly in charge of the Women's Department, St. Louis Hospital, and Clinical Lecturer in

Gynecology, St. Louis Medical College; Physician to Augusta Hospital; Consultant to the St. Louis Female Hospital. 2901 Washington Avenue, St. Louis, Mo.

Founder.—Myers, William Henchel, M.D. *Vice-President*, 1890. 157 West Wayne Street, Fort Wayne, Indiana.

Founder.—Opie, Thomas, M.D. Dean and Professor of Gynecology, College of Physicians and Surgeons; Attending Obstetrician to the Maryland Maternity; Surgeon-in-charge of the Maryland Woman's Hospital. *Executive Council*, 1888–'89. 600 North Howard Street, Baltimore, Md.

1889.—Paine, John Fannin Young, M.D. Dean and Professor of Obstetrics and Diseases of Women and Children in the Texas Medical College and Hospital; Member of the Southern Surgical and Gynecological Association. S. E. Cor. Broadway and Twenty-sixth Street, Galveston, Texas.

Founder.—Potter, William Warren, M.D. Consulting Gynecologist to the Maternity Hospital; Chairman Section of Obstetrics and Diseases of Women, American Medical Association, 1890; President of the Buffalo Obstetrical Society 1884–'86. *Secretary*, 1888–'90. 284 Franklin Street, Buffalo, N. Y.

Founder.—Price, Joseph, M.D. Visiting Surgeon to the Gynecean Hospital; Physician in Charge of the Preston Retreat; Physician in Charge of the Obstetrical and Gynecological Department of the Philadelphia Dispensary. 500 North Twentieth Street, Philadelphia, Pa.

Founder.—Reed, Charles Alfred Lee, A.M., M.D. Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery; Professor of Gynecology at the Polyclinic. *Executive Council*, 1890. 311 Elm Street, Cincinnati, Ohio.

1889.—Rohé, George Henry, M.D. Professor of Obstetrics and Hygiene in the College of Physicians and Surgeons; Director of the Maryland Maternity. 611 North Calvert Street, Baltimore, Md.

1889.—Seymour, William Wotkyns, A.B., M.D. 105 Third Street, Troy, N. Y.

Founder.—Shepherd, George Rubens, M.D. 667 Asylum Avenue, Hartford, Conn.

Founder.—Stanton, Byron, M.D. Professor of Diseases of Women and Children, and Clinical Gynecology, Miami Medical College. *Executive Council*, 1888–'89. 157 Dayton Street, Cincinnati, Ohio.

Founder.—Stewart, William Shaw, A.M., M.D. Professor of Obstetrics and Clinical Gynecology, Medico-Chirurgical College; Gynecologist to the Medico-Chirurgical Hospital. 1801 Arch Street, Philadelphia, Pa.

Founder.—Storrs, Melancthon, A.M., M.D. Attending Surgeon to the Hartford Hospital. *Executive Council*, 1888–'89. 91 Ann Street, Hartford, Conn.

Founder.—Taylor, William Henry, M.D., Ph.D. Dean and Professor of Obstetrics, Miami Medical College; Obstetrician to the Cincinnati Hospital. *President*, 1888–'89. 329 West Seventh Street, Cincinnati, Ohio.

Founder.—Townsend, Franklin, A.M., M.D. Professor of Physiology, Albany Medical College; Visiting Obstetrician and Gynecologist to St. Peter's Hospital; Visiting Physician to the Albany Protestant Orphan Asylum. 2 Park Place, Albany, N. Y.

Founder.—Vander Veer, Albert, A.M., M.D., Ph.D. Professor of Clinical, Didactic, and Abdominal Surgery, Albany Medical College; Attending Surgeon to the Albany Hospital; Consulting Surgeon to St. Peter's Hospital; Fellow of the American Surgical Association; Fellow of the British Gynecological Society; Corresponding Member of the Boston Gynecological Society. *Executive Council*, 1889–'90. 28 Eagle Street, Albany, N. Y.

Founder.—Wathen, William Hutson, M.D. Dean and Professor of Obstetrics, Diseases of Women, and Abdominal Surgery in the Kentucky School of Medicine; Consulting Gynecologist to the Louisville City Hospital. *Executive Council*, 1890. The Fonda, West Chestnut Street, Louisville, Kentucky.

1889.—Wenning, William Henry, A.M., M.D. Professor of Obstetrics in the Woman's Medical College; Gynecologist to St. Mary's Hospital. 146 Laurel Street, Cincinnati, Ohio.

Founder.—Werder, Xavier Oswald, M.D. Gynecologist to the Free Dispensary; Consulting Gynecologist to St. Francis's Hospital. *Treasurer*, 1888–'90. 111 Steuben Street, W. E., Pittsburg, Pa.

1889.—West, Hamilton Atchison, M.D. Professor of the Theory and Practice of Medicine in the Texas Medical College and Hospital. 179 Market Street, Galveston, Texas.

Total, fifty-three Fellows.

MINUTES OF THE PROCEEDINGS

AT THE

SECOND ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS,

HELD IN THE

BURNET HOUSE,

Cincinnati, Ohio,

SEPTEMBER 17, 18, AND 19, 1889.

SECOND ANNUAL MEETING.

Cincinnati, Tuesday, Wednesday, and Thursday, September 17, 18, and 19, 1889

The following-named Fellows were present:

BANTA, ROLLIN L.	Buffalo.
BARROW, DAVID	Lexington.
CARSTENS, J. HENRY	Detroit.
CONKLIN, WILLIAM J.	Dayton.
GARDNER, WILLIAM S.	Baltimore.
HALL, RUFUS B.	Cincinnati.
HILL, HAMPTON E.	Saco, Me.
HOFFMAN, JOSEPH	Philadelphia.
McMURTRY, LEWIS S.	Danville.
MONTGOMERY, E. E.	Philadelphia.
MYERS, WILLIAM H.	Fort Wayne.
POTTER, WILLIAM W.	Buffalo.
PRICE, JOSEPH	Philadelphia.
REED, CHARLES A. L.	Cincinnati.
ROHÉ, GEORGE H.	Baltimore.
STANTON, BYRON,	Cincinnati.
SEYMOUR, WILLIAM W.	Troy, N. Y.
TAYLOR, WILLIAM H.	Cincinnati.
VANDER VEER, A.	Albany.
WATHEN, WILLIAM H.	Louisville.
WENNING, WILLIAM H.	Cincinnati.
WERDER, XAVIER O.	Pittsburg.

Total, twenty-two Fellows.

Letters or messages of regret were received from the following-named Fellows: *Ordinary*—Drs. James P. Boyd, Augustus P. Clarke, Clinton Cushing, Llewellyn Eliot, Edward J. Ill, George C. Jarvis, J. H. Kellogg, Thomas E. McArdle, W. P. Manton, Henry O. Marcy, G. A. Moses, Thomas Opie, George R. Shepherd, William S. Stewart, Melancthon Storrs, Thomas J. Maxwell, and Franklin Townsend. *Honorary*—A. Cordes, M.D., Geneva, Switzerland; Arthur W. Edis, M.D., London, England; Mr. J. Greig Smith, Bristol, England; Mr. Lawson

Tait, Birmingham, England; and John Williams, M.D., London, England. *Corresponding*—A. H. Wright, M.D., Toronto, Ont.

FIRST DAY—*Tuesday, September 17th.*

Morning Session.—The meeting was called to order at ten o'clock by the President, Dr. William H. Taylor, of Cincinnati, who spoke as follows:

GENTLEMEN: We now enter upon the second annual meeting of the American Association of Obstetricians and Gynecologists, and my fellow-townsman and honored associate, Dr. Comegys, has consented to say a word of welcome to us.

Dr. C. G. Comegys, of Cincinnati:

GENTLEMEN OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS: The very pleasant task has been imposed upon me of welcoming you to Cincinnati. In the name of the profession here I greet you as guests, as friends, and as brothers. Though I have not, perhaps, been expected to speak more than mere words of hearty welcome, yet the occasion is so interesting that I feel it not out of place to give a brief expression to some thoughts which the circumstances very properly suggest.

You have come from a wide range in our Nation, to hold conference on the largest subject that pertains to our social existence. However fully grounded you are as general practitioners of medicine, your discussions now are to be wholly related to those things that involve procreation, its organs, its mechanism, and its distresses. The massive misery, agony, and deadliness which this function has imposed upon motherhood in the long ages through which our race has passed, has no parallel in the history of suffering. The demands of nature have not been peacefully and readily accomplished by Nature unassisted. It has only been by art and experience that the dismay in the great office of maternity has been mitigated, and its destructiveness almost completely arrested; so much so, at least, that in this bright day of our closing century, through advanced scientific research and its applied laws, parturition is wellnigh stripped of its dangers and terrors.

This marvellous achievement is not only true in the accomplishments of reproduction, but the varied and special diseases that appertain to this function have likewise been most diligently studied and successfully treated.

These questions have been found to be of great magnitude, and it excites our wonder and admiration to witness the triumphs of surgical skill in the removal of these multitudinous disabilities. What misery the woman of the past has endured growing out of the diseases of her

special anatomy and physiology, no words can describe; to this may be applied the words of St. Paul, "The whole creation groaneth and travaileth in pain."

The beneficient discoveries and skill that have so wonderfully ameliorated so many of these disabilities, constitute the chief glory of modern medicine, and are sure of the promise of final triumph.

It is an immense satisfaction to know that in the progress of these bold and masterly strokes, American practitioners have contributed their full share, and have received a full recognition by all the scientific world; and I will add that there are now in this assembly men who have contributed greatly to these high achievements.

Once more, in the name of the medical profession of this great city, I bid you a hearty welcome to Cincinnati.

The President: You at once, gentlemen, will recognize the impropriety of my making the response to a welcome to my own city, and I am very happy to say that one better qualified than I has consented to perform this office. The First Vice-President, Dr. Montgomery, will make the response.

Dr. E. E. Montgomery, of Philadelphia:

Mr. President and Gentlemen: When I received notice that Dr. Taylor had referred to me the duty of making the response to the address of welcome, I thought it was possibly due to the fact that he knew too much about Cincinnati, and wished to devolve the duty upon some one who knew less of the city.

It seems especially befitting that an organization which had its birth in the "Queen City of the Lakes," and was nursed through its first dentition in the capital of the Nation, should be cared for and looked after during this trying period of its existence—the second summer—by the "Queen City of the West."

It is especially pleasing to me to respond to this address of welcome from an eminent representative of the medical profession in the metropolis of my native State. As the colored minister, in installing a new board of officers, prayed that "this official corpse might be filled with ardent spirits," so it is our desire and hope that this organization may be imbued with some of that spirit which has led the noble sons of this State to become great in war, in politics, and in statesmanship. We indulge the hope that the papers and Transactions of each year may be better and more useful than those that have preceded them, until the work of this organization may be known and read by all men; until it may extend to the benefit of our fellowmen throughout the broad land, particularly to that portion spoken of in the address

of welcome. It is with pleasure that we accept the greetings of the City of Cincinnati in this, our second annual meeting, as we convene to take counsel together, and discuss the important questions that are set forth in our admirable programme.

Upon recommendation of the Executive Council, the following-named physicians were invited, by vote of the Association, to participate in its proceedings as members by invitation:

Dr. C. G. Comegys, Dr. John H. Tate, Dr. W. W. Dawson, Dr. C. D. Palmer, Dr. E. G. Zinke, Dr. John M. Withrow, Dr. Julia Carpenter, Dr. E. S. McKee, Dr. J. G. Hyndman, Dr. W. S. Christopher, Dr. N. P. Dandridge, Dr. Joseph Ransohoff, Dr. D. D. Bramble, Dr. W. E. Kiely, Dr. J. J. Kane, Dr. G. S. Mitchell, Dr. Henry Illoway, Dr. W. B. Davis, Dr. Edwin Ricketts, Dr. Merrill Ricketts, Dr. H. W. Rover, Dr. George E. Jones, Dr. J. L. Cleveland, Dr. Thomas P. White, Dr. William Judkins, Dr. J. C. Culbertson, Dr. W. O. Smith, Dr. O. D. Norton, Dr. C. P. Brent, Dr. M. Cassat, Dr. A. G. Drury, Dr. C. L. Bonafield, Dr. C. O. Wright, Dr. George W. Haile, Dr. Max Kochler, Dr. J. A. Johnston, Dr. B. F. Lyle, Dr. J. H. Hazard, Dr. A. M. Brown, Dr. W. H. McReynolds, and Dr. Mary Osborn, of Cincinnati; Dr. Alexander Dunlap, of Springfield, O.; Dr. C. H. von Klein, of Dayton, O.; Dr. Otho Evans, of Franklin, O.; Dr. Anna Lawrence, of Louisville, Ky.; Dr. Frank D. Sanger, of Baltimore, Md.; and Dr. James Larimore, of Newark, O.

Papers were then read as follows:

1. "Congenital Sinus of the Urachus; Abdominal Incision; Recovery; with Remarks," by A. Vander Veer, M.D., of Albany, N. Y.

Discussed by Dr. Price.

2. "A Case of Extra-uterine Pregnancy; Operation and Recovery," by L. S. McMurtry, M.D., of Danville, Ky.

Discussed by Dr. Wathen, Dr. Montgomery, Dr. Vander Veer, Dr. Hoffman, Dr. Rohé, Dr. Price, Dr. Carstens, Dr. Werder, and closed by Dr. McMurtry.

3. "Treatment of the Ruptured Parturient Uterus; with a Report of Two Cases," by Charles A. L. Reed, M.D., of Cincinnati.

Discussed by Dr. Carstens, Dr. Hoffman, Dr. Price, Dr. Wathen, Dr. Werder, Dr. Vander Veer, and closed by Dr. Reed.

Afternoon Session, 3 o'clock.

Vice-President Montgomery in the Chair.

4. "Two Cases of Intra-uterine Amputation of the Forearm," by Joseph Price, M.D., of Philadelphia.

Discussed by Dr. Vander Veer, Dr. Carstens, and closed by Dr. Price.

5. "The Rectification of Face Presentations," by R. L. Banta, M.D., of Buffalo.

Discussed by Dr. Carstens, Dr. Seymour, and closed by Dr. Banta.

6. "Flap-splitting in Perineorrhaphy; with Special Reference to Tait's Operation," by X. O. Werder, M.D., of Pittsburg.

Discussed by Dr. Wathen, Dr. Hoffman, Dr. Price, Dr. Carstens, and closed by Dr. Werder.

7. "The Necessity of Recognizing Three Planes in the Obstetric Pelvis," by W. W. Seymour, M.D., of Troy, N. Y.

SECOND DAY—*Wednesday, September* 18.

Morning Session, 10 *o'clock.*—The President in the Chair.

8. "How the Refinements of Abdominal Surgery have Influenced General Surgery," by David Barrow, M.D., of Lexington, Ky.

9. "Some Accidents and Complications Incident and Subsequent to Abdominal and Pelvic Operations."

Papers 8 and 9 were discussed together by Dr. McMurtry, Dr. Vander Veer, Dr. Potter, Dr. Price, Dr. Alexander Dunlap, Dr. Hall, Dr. Wathen, and closed by Dr. Hoffman.

10. "The Annual Address of the President," by William H. Taylor, M.D., of Cincinnati.

Afternoon Session, 3 *o'clock.*

Vice-President Carstens in the Chair.

11. "A Study of the Pathology and Treatment of Intra-pelvic Inflammations," by L. S. McMurtry, M.D., of Danville, Ky.

Discussed by Dr. Potter, Dr. Montgomery, Dr. Hoffman, Dr. Wathen, Dr. Price, and closed by Dr. McMurtry.

12. "Vaginal Hysterectomy," by E. E. Montgomery, M.D., of Philadelphia.

13. "The Dry Extra-peritoneal Treatment of the Stump in Hysterectomy," by Joseph Price, M.D., of Philadelphia.

The discussion on papers 12 and 13 was postponed, to enable Dr. Carstens, who was obliged to leave by the first train, to read his paper.

14. "Successful Removal of a Fibroma of the Right Ovary During Pregnancy," by J. Henry Carstens, M.D., of Detroit.

Papers 12, 13, and 14 were then discussed together by Dr. Wathen, Dr. Reed, Dr. Vander Veer, Dr. Price, Dr. Hoffman, Dr. Potter, Dr. Hall, and closed by Dr. Montgomery and Dr. Price.

THIRD DAY—*Thursday, September 19th.*

Morning Session, 10 *o'clock.*—The President in the Chair.

The President presented for examination a large fibroma of the ovary removed three days before, by Dr. Alexander Dunlap, of Springfield, Ohio.

15. "Ligatures and Sutures: What Materials shall be Used?" by Clinton Cushing, M.D., of San Francisco. Read by the Secretary.

16. "Some Considerations on Peritoneal Effusions after Intra-peritoneal Operations," by William H. Myers, M.D., of Fort Wayne, Ind.

17. "Reasons for Drainage after Ovariotomy," by Hampton E. Hill, M.D., of Saco, Me.

Papers 16 and 17 were discussed together by Dr. Montgomery, Dr. Vander Veer, Dr. Hoffman, Dr. Reed, Dr. Hall, Dr. McMurtry, and closed by Dr. Myers and Dr. Hill.

Afternoon Session, 3 *o'clock.*

The President in the Chair.

18. Discussion I.—"Is Craniotomy Justifiable on Living Children?" Opened by George H. Rohé, M.D., of Baltimore.

II. Its Alternatives. (*a*) Abortion, by W. W. Potter, M.D., of Buffalo. (*b*) Premature Labor, by Joseph Hoffman, M.D., of Philadelphia. (*c*) The Forceps and Version, by James P. Boyd, M.D., of Albany. (*d*) Cesarean Section, by E. E. Montgomery, M.D., of Philadelphia, and A. Vander Veer, M.D., of Albany. (*e*) Laparaelytrotomy, by Charles A. L. Reed, M.D., of Cincinnati. (*f*) The Porro Operation, by Joseph Price, M.D., of Philadelphia. (*g*) Conclusions: A Résumé of the whole Subject, by William H. Wathen, M.D., of Louisville.

The following papers were read by title and ordered published in the *Transactions:*

1. "The Forceps as a Means of Rotating the Head in Labor," by Edward J. Ill, M.D., of Newark, N. J. 2. "Umbilical Hemorrhage: Its Treatment," by Llewellyn Eliot, M.D., of Washington. 3. "The Management of the Perineum During Labor," by A. P. Clarke, M.D., of Cambridge, Mass. 4. "A Report of Ninety Cases Operated upon for the Cure of Dysmenorrhea and Sterility by Rapid Dilatation of the Uterus under an Anesthetic," by Franklin Townsend, M.D., of Albany. 5. "New Observations Respecting the Functions of the Round Ligaments of the Uterus," by J. H. Kellogg, M.D., of Battle Creek, Mich. 6. "A Case of Metremphysema," by Thomas E. McArdle, M.D., of Wash-

ington. 7. "A Remarkable Case of Nymphomania," by W. S. Stewart, M.D., of Philadelphia. 8. "Some Points in the Diagnosis of Pyosalpinx," by Rufus B. Hall, M.D., of Cincinnati. 9. "The Need of Specially Trained Men for Abdominal Surgery in Remote Districts," by George R. Dean, M.D., of Spartanburg, S. C. 10. "A Contribution to the History of Ovariotomy on the Insane," by W. P. Manton, M.D., of Detroit, Mich. 11. "Some Peculiarities of Abortion from Artificial Causes," by Hamilton A. West, M.D., of Galveston, Texas. 12. "The Animal Suture: Its Place in Surgery," by Henry O. Marcy, M.D., of Boston. 13. "Some Neuroses of the Menopause," by W. J. Conklin, M.D., of Dayton, O. 14. "The Genu-pectoral or Knee-elbow Position in Obstetrics," by W. H. Wenning, M.D., of Cincinnati. 15. "Sapremia and Septicemia during the Puerperal Period," by William S. Gardner, M.D., of Baltimore, Md.

Dr. Montgomery moved a vote of thanks to the President, Dr. William H. Taylor, and Mrs. Taylor, for the magnificent reception tendered the Fellows at their residence last evening; also to the President for the able and impartial manner in which he had presided over the deliberations of the Association for the past two years, and to whose successful administration it is so greatly indebted for the prosperity that has attended its career. Carried.

Dr. Rohé moved the thanks of the Association be tendered to Drs. Reed, Stanton, Wenning, and Hall for their labors in entertaining the Fellows, and which have resulted in making the visit of the Association to Cincinnati so agreeable as well as profitable. Carried.

The newly-elected officers were then installed as follows: *President*, E. E. Montgomery, M.D., of Philadelphia. *Vice-Presidents*, William H. Myers, M.D., of Fort Wayne, Ind., and R. L. Banta, M.D., of Buffalo. *Secretary*, William Warren Potter, M.D., of Buffalo. *Treasurer*, X. O. Werder, M.D., of Pittsburg. *Executive Council*—A. Vander Veer, M.D., of Albany; Clinton Cushing, M.D., of San Francisco; Charles A. L. Reed, M.D., of Cincinnati; William H. Wathen, M.D., of Louisville; and Hampton E. Hill, M.D., of Saco, Me.

Dr. Montgomery, upon assuming the Chair, thanked the Fellows for their partiality in calling him to preside over the affairs of the Association for the coming year, and asked the further pleasure of the meeting.

The retiring President, Dr. Taylor, then said:

Fellows of the Association: Indulge me a moment in a little personal expression. It is interesting and remarkable to what great things sometimes very trifling events lead. Several years ago it was

my good fortune to meet a gentleman who is now very active in this Association. I cannot tell why, and I do not now wish to inquire how, I seemed to impress him somewhat favorably. He has since manifested great friendship for me. When this Association was projected he not only corresponded with me, but led others to do the same, and I was honored with an invitation to be present at the initial meeting and organization of the American Association of Obstetricians and Gynecologists. It is no matter of mere affectation to say that when I was approached privately and asked to take the position of President that I declined it. I felt that I was entirely unqualified for it. I made the assertion—which you of this city know is entirely true—that I was not qualified, because, among other reasons, in one department of our especial work I made no pretensions, although in another I could claim a good degree of experience. Notwithstanding the incompetency which I felt, I was greatly honored by being elected the first President of the Association. At the second meeting, held in Washington, I was still more honored in being reëlected to the Presidency. And I am confident that all who have been present at this meeting will agree that it is proper for me to say, that I feel it a very great honor to have presided over a body that has had such proceedings as we have had here during the past three days. I would say to those members who have been so partial to me, that whatever the future may have in store for me, I am sure that throughout my life one of the very greatest honors I shall ever enjoy will be that which this Association has conferred upon me. And it is no use at all for me to say, "I thank you for it;" it has been a matter of daily pleasure and, in some degree, of gratitude that I held this position, and my association with all the members has only been that of satisfaction.

I feel that besides expressing these sentiments there is another duty that I owe to the Fellows of the Association. If you look at our *Annual Transactions*, you will see that my name occupies a very conspicuous place. If you have observed this little programme of the past three days, you will see my name occupies a very prominent place there also. There is a fable, and it serves to point my moral: There was a certain sovereign who desired to perpetuate his memory, and caused an obelisk to be cut, upon which his name was all that was seen; but as time passed on the surface of that obelisk disintegrated and the name of the sovereign passed away, but the name of its sculptor stood revealed and remained. And so, my friends, in the future history of the Association, my name that is prominent now, will pass away; but upon the obelisk of the Association, erected by the earnest work of its members, there will stand in imperishable letters the name of WILLIAM

Warren Potter; and to him, and not to me, are due all the successes of the Association to this time.

Near where we now meet stands a building that we Cincinnatians are exceedingly proud of. It is regarded as one of the greatest achievements of the man whom competent architects say was the only original architect of his day. That building impresses every one with its beauty, with its grandeur; yet before that beautiful structure arose, down at its bottom there were laid stones that presented no attractive appearance, and that to-day are buried, but the grand structure has arisen upon them. I feel that in the future of this Association, with all its usefulness and all its successes, I may be obscured; but allow me to hope that 'midst all those grand achievements of which you now give promise, looking back to the origin of our Society, I may be regarded as one of those stones upon which this Association has been built. And I assure you, gentlemen, that so long as I live my best wishes shall attend the American Association of Obstetricians and Gynecologists.

Dr. Potter having been called upon, said:

Mr. President: It ill-becomes me, at this late hour, when all are so anxious to seek rest and the early outgoing trains, to absorb precious time with mere words. Permit me a single thought, however, and I will be brief. I fear our distinguished and honored President, now retiring with his "blushing honors thick upon him," who has done so much to make our Association known and respected among men, and to give it such promise of stability, has over-estimated what little I may have been able to contribute toward that much-desired consummation. Be that as it may, I can truly affirm that the fondest hope that I cherish in regard to all my medical aspirations, one that is guided by the proudest aim of my life, is to see this Association so deeply and firmly built down in its foundation depths that its superstructure may defy even the gnawings of the envenomed tooth of time. And in the distant future, when the student of history shall climb the steeps of fame to examine the records of the centuries, may he find high up, emblazoned on the scroll, not the name of any one individual, but rather, cut in conspicuous lettering, more lasting than brass or the Egyptian Pyramids, the proud title of our guild, The American Association of Obstetricians and Gynecologists!

For the kind personal expressions of the retiring President, prompted by his kindest of hearts, I can no more than thank him; but, as a parting word, I beg you to let our memory of him always be, that he was our able, genial, and faithful first President.

On motion of Dr. Reed, the Association then adjourned, to meet in Philadelphia, on the third Tuesday of September, 1890.

WILLIAM WARREN POTTER,
Secretary.

Executive Session.

Wednesday, September 18, 1889.

The President, Dr. William H. Taylor, in the Chair.

The Treasurer made his report, showing a balance on hand of $98.66.

The Secretary reported the disbursement of the contingent fund, with abstract and vouchers.

On motion, Drs. Stanton and McMurtry were appointed a Committee to audit the accounts of the Secretary and Treasurer. They subsequently reported the accounts and vouchers of the financial officers correct.

On motion, the Secretary was authorized to draw upon the Treasurer for such sums of money as might be necessary to publish the *Transactions* for 1889, in accordance with the contract with the Association's printer, Mr. William J. Dornan, of Philadelphia.

On motion of Dr. Montgomery, seconded by Dr. Price, it was unanimously voted to hold the next annual meeting in the City of Philadelphia, on the third Tuesday of September, 1890.

Dr. Montgomery asked unanimous consent to withdraw his proposed amendment to the Constitution, offered at the last meeting, relating to the name of the Association. Granted.

Dr. McMurtry offered an amendment to the By-Laws, as follows:

To change the word "fifteen" in the second paragraph of Section IX.—title "Finance"—to the word "twenty."

Laid over for one year, under the rules.

The following telegram was ordered sent:

Cincinnati, Ohio, September 17, 1889.

To Dr. H. P. C. Wilson, President American Gynecological Society, 19 Boylston Street, Boston, Mass.: The American Association of Obstetricians and Gynecologists, now in session, sends cordial greetings to its older sister, and hopes its present meeting may contribute further to its already brilliant scientific record.

William H. Taylor, *President.*

The following reply was received:

Boston, Mass., September 18, 1889.

Dr. William H. Taylor, President of the American Association of Obstetricians and Gynecologists: The American Gynecological Society, now in session, acknowledges with pleasure the cordial greeting of the American Association of Obstetricians and Gynecologists, and cordially reciprocates its kind sentiments.

H. P. C. Wilson, *President.*

On motion, authors were granted permission to publish accepted papers in one reputable medical journal, the Secretary to be notified of such proposed publication.

The Secretary, in behalf of the Executive Council, presented a list of names as nominees for Honorary and Ordinary Fellowships. The Association then elected by ballot the following gentlemen:

Honorary Fellows—Dr. George Granville Bantock, of London, England; Dr. A. H. Freeland Barbour, of Edinburgh, Scotland; Dr. A. Charpentier, of Paris, France; Dr. J. Halliday Croom, of Edinburgh, Scotland; Dr. Alexander Dunlap, of Springfield, Ohio; Dr. Fr. Eklund, of Stockholm, Sweden; Dr. W. A. Freund, of Strassburg, Germany; Dr. Thomas, Keith, of London, England; Dr. G. Leopold, of Dresden, Germany; Dr. J. Nicolaysen, of Kristiania, Norway; Dr. M. Sänger, of Leipzig, Germany; Dr. B. S. Schultze, of Jena, Germany; and Dr. F. Winckel, of Munich, Germany.

Ordinary Fellows—Dr. David Barrow, of Lexington, Ky.; Dr. J. H. Branham, of Baltimore, Md.; Dr. Bernard Burns, of Allegheny City, Pa.; Dr. William J. Conklin, of Dayton, Ohio; Dr. W. E. B. Davis, of Birmingham, Ala.; Dr. George R. Dean, of Spartanburg, S. C.; Dr. Richard Douglas, of Nashville, Tenn.; Dr. William S. Gardner, of Baltimore, Md.; Dr. Rufus B. Hall, of Cincinnati, O.; Dr. Joseph Hoffman, of Philadelphia, Pa.; Dr. J. F. Y. Paine, of Galveston, Texas; Dr. George H. Rohé, of Baltimore, Md.; Dr. William Wotkyns Seymour, of Troy, N. Y.; Dr. William H. Wenning, of Cincinnati, O.; and Dr. Hamilton A. West, of Galveston, Texas.

The following-named officers were then elected by ballot; *President*, E. E. Montgomery, M.D. of Philadelphia. *Vice-Presidents*, William H. Myers, M.D., of Fort Wayne, Ind., and Rollin L. Banta, M.D., of Buffalo. *Secretary*, William Warren Potter, M.D., of Buffalo. *Treasurer*, X. O. Werder, M.D., of Pittsburg. *Executive Council*—A. Vander Veer, M.D., of Albany; Clinton Cushing, M.D., of San Francisco; Charles A. L. Reed, M.D., of Cincinnati; William H. Wathen, M.D., of Louisville, Ky.; and Hampton E. Hill, M.D., of Saco, Me.

Resolutions of thanks, offered by Dr. Montgomery, were tendered to the proprietors of the Burnet House, for the use of the spacious and delightful apartments provided for the meeting, and for other courteous attentions received at their hands; to the Cincinnati Chamber of Commerce, for the polite invitation to visit that magnificent structure; and to the press, for many favors and attentions shown.

The Executive Session was then adjourned.

WILLIAM WARREN POTTER,
Secretary.

PAPERS

READ AT THE

SECOND ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS,

HELD IN THE

BURNET HOUSE,

Cincinnati, Ohio.

SEPTEMBER 17, 18, AND 19, 1889.

THE PRESIDENT'S ANNUAL ADDRESS.

By WILLIAM HENRY TAYLOR, M.D.,
CINCINNATI, OHIO.

When this Association assembled one year ago, those who had been active in its organization naturally felt much solicitude as to the result of their projects: by some whose opinions were entitled to much respect, the propriety of such organization was questioned; to others, the existence of quantity and quality of material of which to form the Society was problematical, and it is violating no secret to say that in some minds there was a decided feeling of opposition awakened by the effort; very reasonably, therefore, the untried experiment seemed to have elements of much uncertainty in it. Need I say anything to-day of the result of the experiment? To those who attended that meeting there must ever arise a feeling of pleasure in recalling the cordial friendships there formed, and of pride and satisfaction in recounting the scientific fruit produced; to those who did not attend, we confidently refer to our published *Transactions* as evidence of what was accomplished. In convening this year, no such depressing feelings prevail, but, having now the approval of the profession and assured of our success, my greeting to you can only be one of congratulation and confidence. And while thus retrospecting our first annual meeting, I am glad of the opportunity to express our thanks to the journals of the country, and to the reviewers of our work for their courtesy and favorable comments.

So much could easily be written; but, as I have sought for a topic upon which to speak to you, I have been more and more impressed with the difficulty of the task. Were this Society composed of representatives of all the different branches of our profession, it might be an easy thing for a speaker to impart to some of them some valuable information from his experience in his own special

line of work; but to an assemblage of men who read the same literature, who have studied the same morbid processes, and to a certain degree have all done similar work, it becomes a matter of great difficulty to speak with any hope of giving you any new thoughts, or valuable suggestions.

In looking at the last published report of one of the most eminent societies of this kind, I find the President's address composed of three features: congratulations on the financial status of the society,—that I can reproduce without plagiarism; a review of work done by its members,—to you no such recapitulation is needful; and occupying large space are obituary notices of members deceased during the year. Proper and commendable as it is to speak kindly of those who are gone, it is a source of much greater satisfaction that no member of this Association has made himself a fit subject for such kindly comment; and so the address before this prominent society affords me no aid in speaking to you.

A recent writer has said: "There are two classes of changes and improvements in medical progress: the one, the fashions of theory and practice which, leaving something of gain behind them, are eventually lost sight of on the advent of something newer or more taking; in the other class, are the great advances in medical science which remain forever as part of the great inheritance we have received from our predecessors, and which are the essential landmarks of our progress." To these I venture to add: those suggestions which may fail to accomplish that for which they were originally designed; but they throw a side light which illumines some dark corner, and thereby make plain some hitherto unknown region in the world of science. And yet another very important element of progress is the elimination of the untrue, and assuredly he who reveals an error is only less a benefactor than he who discovers a truth. Viewed from these standpoints of criticism, while a survey of the progress in our field of work the past year may offer no one remarkable feature, yet it certainly affords material evidence of advance in the right direction; and I think all must recognize that one marked and gratifying characteristic of the year, has been successful effort for greater accuracy in diagnosis and for determining the indications for operative procedure; and a glance at the status of particular cases shows very satisfactory change. The condemnation of laparatomy so common a few months ago is

now much less frequent; experience having established more definitely the proper grounds for operation, an enlightened conservatism is coming to prevail; and, on the other hand, more accuracy in diagnosis being acquired, fuller justification for the procedure is demonstrated.

The question of extirpation of the uterus is less prominent,—because, I believe, of more unanimity of approval; and with the success indicated by Sir Spencer Wells in his recent lecture, and especially with the statistics of Munchmeyer, of 110 extirpations with a mortality of 4.5 per cent., the operation must be marked with approval, and the terse statement of Sir Spencer Wells, "The best means to prevent return is to operate early," shall become an aphorism for our guidance; and yet while advocating such treatment I am not forgetful of the fact that the prime element, ability of early diagnosis, as all know and as Landau has recently shown, is still a desideratum. No longer can Alexander's operation be classed among questionable resources of our art; accepting it as useful and safe, we only need make definite the cases to which it is appropriate.

Abdominal fixation of the retroflexed uterus has received considerable attention, and it is interesting to see the unanimity of the verdict regarding it; American and European writers agreeing that it must hold place only as adjuvant to other operations. Ch. Leopold, however, adds to the conditions for its performance as given by Zerner, Bode, and others, this further: "For retro-deviations of the non-adherent uterus, if the sufferings of the patient depend upon this condition, and all other means prove unavailing." I incline to the opinion that we should consider this a good case for shortening the round ligaments.

Max Runge has just called attention to a fact worthy of most serious consideration, viz., that the operation which at present is attended by the heaviest mortality in all gynecological operations, is that for the removal of tumors which are the least injurious to the patient. He says a high mortality for ovariotomy is 10 per cent., for extirpation of the uterus for carcinoma is 11 per cent., while that for myomata is 24 per cent. Of course, we shall not remain satisfied with such results; but do not the two facts, of low death-rate from the disease and high death-rate from the operation, suggest the query as to the propriety of some other method of treatment?

Very likely your thoughts at once revert to electricity, but I believe the verdict of a year's experience will not sustain the strong assertions made in its behalf; yet the testimony in its favor by men of such eminence as Keith and Aveling must prompt us to give it place as a therapeutic agent, and just in the class of cases now under consideration does it offer most advantage, and, I think, a recent statement by C. E. Underhill, President of the Edinburgh Obstetrical Society, will fairly mark its place. He says: "I believe we shall find it a valuable and efficient aid in our work, and in cases mostly in which medical and so-called expectant treatment is of no avail, and in which the relief offered by surgery promises to be purchased at too hazardous a rate;" it was not, however, to advocate electricity that I introduced this topic, but to suggest, in view of the ultimate favorable issue of these cases, the propriety of restricting to a great degree the resort to surgical measures.

The brilliancy of operative procedure naturally obscures other work, and the apparently greater gravity of a case justifying an important operation diverts attention from suffering less severe, but equally needful of treatment; perhaps, because of these reasons, as well as because of poor success in treatment, uterine displacements have claimed comparatively little attention of late; but the recent appearance of Schultze's views must serve to awaken interest and advance our knowledge of this class of ailments, while Hermann's elucidation of the relation of systemic causes to local effects must give valuable aid in treating some of them.

As is not rarely the case, subjects which may have seemed satisfactorily settled, and, therefore, requiring little further consideration, are revived and become the theme of renewed disputation. An instance of such polemic resuscitation is the active discussion now going on with regard to the phenomena and conduct of the third stage of labor. We all know that controversy on this topic has continued in Germany for several years, with probably little advantage either to the combatants or to science; but certainly attention is called earnestly to the subject by Dührssen's statement, a few weeks since, that "in Prussia a woman dies every day from post-partum hemorrhage." Now, if we recall the fact that such fatality can occur only among a limited portion of our population, the relative mortality would seem very large; allowing the period during which such an accident could occur to be from fifteen to fifty

years of age, we should have 1 death from hemorrhage after delivery in less than 200 from all causes among women in the period mentioned. How near the truth this may be in this country we have no means of knowing, yet I fear it is not a great exaggeration. The great confidence which we have had in the common method of dealing with the placenta, might lead us to the belief that we should be exempt from such disaster; but just now our idols are being broken, and a man so highly esteemed as D. Berry Hart says: "I consider Crédé's the most dangerous plan possible for the separation of the placenta." And for the treatment of these most dangerous accidents of the parturient woman Dührssen suggests plugging of the uterine cavity and the vagina; with these facts and these statements so much at variance with generally accepted opinions, certainly it is the part of wisdom carefully to survey the ground upon which our confidence is built.

The very satisfactory results recently obtained in Cesarean section must fully establish it now, not as an operation which *may* be performed occasionally, but as one which *must* be performed if the obstetrician would escape censure; while this proposition is laid down as beyond discussion, the method is still a proper subject for debate. I think the American profession had almost unanimously arrived at the conviction that the Porro method was not to be chosen for the cases likely to be encountered in this country; but the recently published statistics of R. P. Harris show such favorable results for this operation (*British Medical Journal*, March 30, 1889: for Porro, 9 deaths in last 50 operations; 12 children lost in 81 operations. April 13th: last four years' Porro mortality 19 per cent., and the Sänger 26+ per cent.) that it certainly makes strong claim for consideration; and, while the two methods are not equally adapted to all cases, we should seek earnestly to differentiate the conditions to which each operation is respectively adapted.

The subjects of ectopic pregnancy, pelvic suppuration, and craniotomy have occupied such a large space in the literature of the past year that it would be superfluous for me to attempt to consider them, and I am sure you will cheerfully excuse me for such abbreviation of my remarks.

A review of the progress in our branch of medicine the past decade is a source of astonishment and a cause for congratulation, for no part can show such great additions to life and comfort; but

I need only make the assertion to elicit your assent, that there yet remains very much land to be possessed. With the intelligent restlessness which characterizes the educated mind, we must press forward, and no prophetic power is required to predict that great progress will be made.

The recent advancement in all departments of science and the wonderful practical application of newly acquired facts disarm incredulity, and we dare place no limit upon the possible acquisitions of the near future. The Utopias of to-day may be the familiar dwelling-places of to-morrow; and, actuated by the noble sentiment which so characterizes our profession, of seeking the truth for the truth's sake, we may be sure of grand additions to our knowledge and skill, and I can utter no better benediction than the hope that this Association may bear its full share in making these acquisitions.

CONGENITAL SINUS OF THE URACHUS; ABDOMINAL INCISION, RECOVERY; WITH REMARKS.

By A. VANDER VEER, M.D.,
ALBANY, NEW YORK.

Miss H. N., aged twenty years, whose case I was requested to see with Dr. Du Bois, of this city, presented the following history:

Her mother stated that ten days after her birth the nurse discovered an unusual discharge from the umbilicus. The family physician's attention was called to it, and he thought it was the result of delayed healing of the vessels of the umbilical cord. The discharge continued at irregular intervals, at times being very profuse, then quite subsiding, but for the past two years has been very distressing, in that it has been more profuse and very offensive; she also had an unpleasant, sickening sensation, so that she was unable to bear the weight of her clothing, and was prevented from horseback riding, or any other active exercise. From the parts above the navel there exuded at times a sebaceous substance, quite sticky and very offensive in odor, and which somewhat excoriated the parts.

On May 20, 1886, patient was given an anæsthetic, and I found no difficulty in passing the probe down into the sinus some three inches toward the superior fundus of the bladder. The parts were carefully incised, the sinus thoroughly opened up, and I was quite surprised to notice its length and depth, as I was obliged to divide the tissues from the linea alba down to the subperitoneal space. The parts were thoroughly curetted, and the lower portion brought together with sutures, while the upper part was carefully packed with iodoform gauze and allowed to granulate. The union was perfect about the lower part of the incision, and the upper part healed gradually after about four weeks of treatment. The patient recovered, expressing later on, at the end of two or three months, the most marked relief from all her previous symptoms, and a complete recovery from the disagreeable discharge and odor that had annoyed her for so long a time. I do not know that there are any particular points of interest in the case except as to the previous treatment, which had been carried on in the most excellent manner possible and was very thorough, but entirely failed, so that the operation seems entitled to the credit of the recovery of the patient.

Cases of congenital sinus of the urachus are somewhat rare and unique; very few have been reported. It is fair to assume that

a sinus of this kind is the remnant of the urachus or allantois of fetal life. Cysts of the urachus have been reported occasionally, but this did not partake of so formidable a nature.

DISCUSSION.

Dr. Joseph Price, of Philadelphia.—I have personal knowledge of one case, though I cannot call it congenital sinus of the urachus. As Dr. Vander Veer has said, the cases are few. The case I will briefly report is one in my own experience, the trouble developing in the woman shortly after childbirth. She became a widow and remained so ten years, having during this time superficial abdominal trouble in the region of the urachus. Finally drainage was established at the umbilicus, giving exit to quite a large quantity of pus. She came into my hands, and I incised to the pubis beneath all the cheesy disorganized structures, leaving, as I feared at the time, a sinus passing around to the left. Later I was compelled to incise deeper and irrigate; the second operation brought about a perfect cure. She had been married a second time some five years without conceiving. It is curious that she should at once after the second operation conceive and give birth to a fine, healthy child. She suffers pain about the left ovary.

A CASE OF EXTRA-UTERINE PREGNANCY. OPERATION; RECOVERY.

By L. S. McMURTRY, M.D.,
DANVILLE, KENTUCKY.

My purpose in reporting the following case is to illustrate some essential features in the pathology and symptomatology of extra-uteriue pregnancy, and at the same time to emphasize the necessity of prompt operative interference. At our meeting in Washington last year, this subject was more carefully considered and more thoroughly elucidated than in any previous discussion of the urgent questions involved. It is at the present time one of the most interesting and important practical subjects to which the attention of the profession can be directed.

Mrs. W. S. E., aged twenty-eight years, gave birth to her first child on the 8th of December, 1888. On the 8th of March, 1889, notwithstanding the fact that she was nursing, the catamenia returned. She also menstruated in April and May, but in June missed her period and exhibited some of the rational signs of pregnancy. On the 26th of June she suffered a violent paroxysm of pelvic pain. The pain was very severe, paroxysmal, and long continued. Very soon after this paroxysm uterine hemorrhage appeared. The flow varied at times as to quantity and was lighter than the normal menstrual discharge. This discharge, slight at first, increased in quantity on the following day. On the 28th a second paroxysm of pain occurred, less severe than the preceding one, and the uterine flow increased and continued for a week. Then there was a week free from pain and hemorrhage. The milk returned to the breasts and the patient arose from bed. At the end of a week she was again seized with a violent paroxysm of pain, and uterine hemorrhage recurred. For a week there was daily paroxysmal pain of diminished severity, when once again a period of apparent relief came. On the 27th of July she suffered pain of unusual severity, with symptoms of shock and collapse. On the 29th I was called to see her for the first time, and her husband, a prominent young physician of a Southern city, was summoned by telegraph. Having been at her bedside at the onset, her husband was lulled into an over-confident security by the apparent relief which followed the first

paroxysm, and had returned to his home and duties. From him I obtained the very accurate history of the case detailed above.

I found the patient pale and feeble from loss of blood, with pinched features, rapid pulse, and serous vomiting. The abdomen was distended and tender, and the lower limbs drawn upward. The uterus was pushed to the left side, and the bloody flow continuous. I proposed immediate operation, which was performed on the morning of July 30th, after consultation with Drs. William Huffman and Bush, of Lancaster, Ky., who were in attendance, and gave me every possible aid in the operation and care of the patient afterward. Dr. J. B. Kinnaird, of Lancaster, was also present at the operation and rendered valuable assistance. On opening the abdomen large blood-clots presented; the pelvis was filled with clot. This was quickly turned out, and I sought the fundus uteri with my fingers. The fetal ball was found on the right side, with ruptured tube. All was securely tied away and removed; the abdomen cleansed with hot water; drainage-tube inserted and abdomen closed. Length of incision three inches; patient on the table thirty four minutes. Nausea and vomiting, which had been conspicuous and distressing symptoms for two days preceding the operation, persisted for twenty-four hours, but subsided and disappeared after the bowels were thoroughly moved by several small doses of calomel.

The progress of the case was uninterrupted. The drainage-tube was removed on the fourth day, and convalescence was prompt. The lady is now quite restored to good health.

I here present for examination by the Fellows of the Association the fetal sac, with placenta, and the Fallopian tube and ovary.

Recalling the history of the case as I have narrated it, you will see that the first attack of pain was from rupture of the Fallopian tube. Then there was a respite from pain and apparent relief for a time, when the fetal sac broke, as shown in the specimen, allowing the fetus to escape into the abdomen, and filling the abdomen with blood.

The great practical lesson conveyed by this case is, that the medical attendant should urge prompt interference by abdominal section in cases presenting these symptoms. An entire month elapsed between the time this lady was first attacked with violent paroxysms of sickening pelvic pain and the operation for her relief. The operation was then performed upon an exsanguinated patient, with peritonitis established. When the diagnosis is questionable, the trivial risk of an exploratory incision is not to be compared with the immense peril of delay.

A London weekly of recent date announced that three operations for extra-uterine pregnancy had been performed during the week

in one district of the metropolis. A distinguished Fellow of this Association, within two years past, has operated in sixteen cases. Formad, of Philadelphia, states that within a brief period of his service as coroner's physician he found, post-mortem, nineteen deaths from ruptured tubal pregnancy. From these facts it is apparent how frequently this condition obtains. In this great country of ours, with its teeming millions scattered over the vast area of the States, who can approximate the number of women dying annually of ruptured tubal pregnancy, diagnosticated and treated as "idiopathic peritonitis," "accidental hemorrhage," etc.?

In these cases everything as to results depends upon prompt surgical interference; realizing which, let us appeal to the great body of the profession to recognize this important advance in pelvic surgery and rescue the patient by abdominal section, instead of consigning her to the so-called conservative fate of opium euthanasia, toying with electricity, or applying expectant methods.

DISCUSSION.

Dr. W. H. Wathen, of Louisville, Ky.—Though I had not expected to open the discussion on this very interesting and practical report made by Dr. McMurtry, it is yet with pleasure, Mr. President, that I respond to your invitation to do so. It is a question that I have thought over, and studied a great deal, since it has been presented to us in a practical form, so that gratifying results have followed surgical treatment. Before the report of successful operations by Mr. Tait, I had expressed the opinion that no treatment was rational other than surgical treatment. I have never believed that the employment of means to destroy the life of the embryo without removing it was the correct treatment, for it is impossible positively to diagnosticate extra-uterine pregnancy prior to the rupture of the sac. Electricity is now the popular remedy used to destroy an extra-uterine pregnancy. I am on record as positively opposed to this treatment: first, because I believe it is next to impossible to diagnosticate an extra-uterine pregnancy early enough to use electricity to destroy the embryo; second, if we succeed in diagnosticating an extra-uterine pregnancy early enough to destroy it, then I doubt the propriety of doing so, because we leave a pathological condition but little less dangerous than ectopic pregnancy itself. We destroy the embryo, but we leave a foreign mass that places the woman's life in constant jeopardy, and

it may at any time be sacrificed. The only rational treatment is abdominal section and the removal of the gestation sac. If we diagnosticate pregnancy prior to rupture, and decide that the pregnancy should not continue, laparatomy and the removal of the sac are indicated; it is the most surgical and the most successful. Since we understand the pathology of this subject better, we can arrive at safer conclusions as to the treatment indicated: we know where the ovum is first implanted, and just where the vessels penetrate the maternal structures. Mr. Tait says that his first case was not successful because he did not know how to operate. We now recognize the fact that probably all cases are primarily tubal, and that the ovum secondarily implants itself upon other structures. This indicates the necessity of ligating the placental vessels at their point of origin, so as to control hemorrhage. I will relate a case that I recently operated on that probably was an extra-uterine pregnancy coincident with a uterine pregnancy, though being in great haste to get to the train I did not carefully examine the internal parts of the specimen. I was called in the country to operate for an ovarian tumor. I found a hard substance extending from the uterus to the under surface of the liver, with obstruction of the bowels for ten days. In making the section, the tumor was found to have its origin in the folds of the broad ligament. The tumor was five inches in diameter in the abdominal cavity, but at the broad ligament the diameter was two inches. The Fallopian tube was destroyed, and the layers of the broad ligaments were separated an inch on the side of the uterus. The uterus was enlarged as much as at three and a half months' gestation, and every condition of pregnancy existed. I do not give this as a case of extra-uterine pregnancy, but the symptoms, I think, point in that direction. I wrote to the attending physician to examine the specimen, but it had been destroyed. This case impresses upon us the importance of operating early in cases where we have internal hemorrhage and suspect extra-uterine pregnancy. When the abdomen was opened in this case, a great extent of bowel was found to be almost gangrenous; the adhesions had caused the constriction and subsequent disintegration of the bowel.

Dr. E. E. Montgomery, of Philadelphia.—I cannot too highly commend the promptness with which Dr. McMurtry operated in the case he has so well related to us. Prompt operation, he says, in cases where rupture of the tube takes place, is the only relief for the patient. In such cases the danger of fatal hemorrhage is so great that early operation is clearly indicated. It is true, however, that many cases recover without operation. The danger from hemorrhage will depend somewhat upon the seat of the rupture. Where it takes place into the fold of the broad ligament a clot soon forms, and by its pressure

resists further hemorrhage. In many cases hemorrhage is active; the rupture having taken place through the peritoneum large vessels are opened, and the patient bleeds until syncope occurs, leading to cessation of hemorrhage; only to return, however, as soon as the patient revives under stimulants or the reaction of her vital forces, and it continues until again arrested in like manner. These patients may die within twenty-four hours, when, upon autopsy, the abdomen will be found filled with blood.

With regard to the particular case before us, I do not think it is necessarily indicated that there was a rupture of the tubal sac some weeks prior to the hemorrhage. Frequently, as the tube enlarges, the final rupture is preceded by partial rupture of the over-stretched sac walls, which produces pain, with a slight amount of plastic exudation and peritonitis, sufficient to agglutinate the surfaces and reinforce the sac. In some cases repeated attacks of this character may occur. In other cases, extensive rupture occurs at once, producing immediate death from shock, or resulting within a few hours in such a termination from hemorrhage.

I cannot agree with Drs. McMurtry and Wathen that electricity should not be tried. In the case whose history we have just heard, had electricity been applied with the first indication of rupture, it is quite reasonable to suppose that the arrest of the growth would have been accomplished and the subsequent danger to the patient obviated It is well known that we cannot always impress our patients, or their attendants, with the gravity of the situation sufficiently to secure their consent to an abdominal operation. The patient is very loath to accept the knife as the only escape from the difficulty. In such cases, are we to leave our patients to die simply because we are not privileged to resort to our choice of procedure? Are we to discard a method which has proven of value in the hands of others? As to the use of electricity, experiments have demonstrated the fact that animals, of even greater vitality than the embryo, have been destroyed by passing the current through water in which the animal was swimming.

In the cases known as tubo-ovarian, it is not unfrequently found that the placenta becomes attached not only to the mouth of the tube but to the intestine as well. Serious disturbance of the alimentary canal, in the form of diarrhea or obstinate vomiting, results. The removal of the placenta by laparatomy would be attended with frightful hemorrhage. The application of means to control hemorrhage endangers the vitality of the bowel wall. Here the death of the embryo through the agency of electricity would be followed by decreased vascularity, and a subsequent operation thereby rendered more practicable.

Dr. A. Vander Veer, of Albany, N. Y.—Dr. McMurtry, in reporting his case, has given us the complete train of symptoms that such cases so frequently present. I think his conclusions are very correct, especially with regard to the rupture of the tube, and, later on, the rupture of the sac. These cases are not, however, always so perfectly clear regarding the time for doing the operation which saved the life of his patient. In January I received a telegram from Dr. Davis, living about forty miles west of me, saying: "Look for letter. Come prepared to operate for extra-uterine pregnancy." The letter reached me about three hours later. The patient, a married lady, had had two children. Her doctor and another physician, Dr. Beach, were called to see her about eleven o'clock at night. She had passed her period two weeks previously. They found her in a condition of profound collapse; used hypodermic injections of ether, brandy, and ammonia, with hot applications, and she rallied. Dr. Davis believed an operation would be called for, and telegraphed me. He said in the postscript, two hours later: "Patient has rallied very decidedly; husband opposed to operation. Hold yourself in readiness." At four o'clock in the afternoon I received a telegram saying she was better. Late in the evening came a telegram saying: "Patient still better." That patient recovered. No operation was done. I wrote him I believed he would have another explosion in a short time. Three months afterward he said: "Our patient has made a good recovery, but I find an enlargement on the right side the size of an orange." That case continued to improve, and is apparently doing very well. What the final result will be I am in doubt; but, all things considered, I believe an operation would have been best.

I will briefly relate a case that occurred in Pittsfield, Mass., and was reported to me by Dr. F. C. Burton. Patient was married, had had one child; had complained for nearly two months, had ceased to menstruate for three months; consulted her physician, not Dr. B., on the 12th of January, 1889, stating she had some bladder trouble, as she supposed; the physician prescribed for that trouble. On the 20th, he was summoned to see her, but she died in two hours afterward. The physician, Dr. Burton, who gave me this history, was the coroner's physician, and was called upon by the relatives, saying they feared she had not died from natural causes. I told him I believed he had a case of extra-uterine pregnancy, and by all means to have an autopsy. It was a case, as you observe from the photograph that I now exhibit, where a prompt operation just as the hemorrhage began might possibly have saved her life. She lived some six or eight hours after the second call, which was eight days after the first one.

Dr. Joseph Hoffman, of Philadelphia.—I had not expected to say anything on this question, and I will promise to be brief. I have very positive notions on the certainty of early diagnosis, and on the value and necessity of electricity. In the first place, I take it, Dr. McMurtry does not believe in the certainty of diagnosis except as an accident. I think probably the most damaging blow to abdominal surgery has been the report of Dr. Thomas, relative to the treatment of twenty-six or twenty-seven cases by electricity. I have gone over these cases with care. I must say that, looking at them in the light of early diagnosis, I think they utterly fail. The question of diagnosis in most of them has depended on the question of rupture. Of the whole series reported, there are very few which have a probability of extra-uterine pregnancy without rupture's having occurred, but must depend entirely on rupture for the diagnosis. Now, if we say we can diagnosticate the condition before rupture, we say a good deal that is not established by these cases. If electrical treatment is only to be thought of before rupture, and these cases diagnosticated after rupture, the whole argument fails, because it evidently has been used after rupture. I think the whole argument is fallacious, and most of the cases diagnosticated as extra-uterine pregnancy have probably been something else. So far as the treatment is concerned, the advocates of electricity make great ado about the danger of abdominal section. If we find an extra-uterine cyst which has never ruptured, as large as an egg, it is the simplest thing in the world to get out. The removal of the cyst is a thing than which nothing is more easily accomplished. These are the cases in which electricity claims its wonderful, though questionable, results. The advocates of electricity relegate ruptured sacs and adherent placentæ, with all the direful concomitants that shock and hemorrhage induce, to abdominal section, but shudder and lament the temerity which deals radically with the growth while it is yet uncomplicated. Another point, and an important one, is the leaving of this cyst in the abdominal cavity. We know that extra-uterine cysts if left to themselves frequently slough and suppurate; they come out by the vagina, rectum, bladder or umbilicus. The question comes, Is not the danger of leaving one of these masses to slough out, greater by far than to take out the mass originally discovered, by abdominal section? I am sure that a man who has dealt with many of these cases will invariably prefer to remove the mass without waiting to try electricity. If a woman is told that she has a mass in her abdomen that is liable to rupture and cause her to bleed to death, I do not think she will object to section.

A word as to the possibility of exact diagnosis. A woman had a child fifteen months old, so that a long previous period of sterility was

not to be considered. She had menstruated regularly after the child was born, and only missed one period by two weeks. Here was no possibility of diagnosticating extra-uterine pregnancy from ordinary symptoms, and the presence of the mass on one side. She had a pus tube on the other. Nobody could tell what I had until after the operation. In fact, to pretend exact diagnosis previous to it would have been worthy of Munchausen or the electricians. After the operation it was a study to tell where and how the whole thing had been emptied. These are the cases the electricians charitably dedicate to surgery, while they writhe in horror at the mere idea of the removal of a simple cyst by the same means. The matter of treatment, I think, settles itself down to the importance of early eradication of any discovered mass in the pelvis. If the lesion is allowed to remain and complications to go on developing, as they must by growth of the placenta, we are endangering the life of the woman; and, by electricity, we are tampering with the life of the woman, and leaving in the pelvis a substance which is more dangerous than the primary growth; furthermore, as the time advances the danger increases.

Dr. Georgé H. Rohé, of Baltimore.—Several statements have been made here as if they were demonstrated facts; I propose to question some of them. One of the statements made is that a diagnosis of extra-uterine pregnancy is never possible, or rarely so, until after the rupture of the cyst. The fact is, that such diagnosis has been made before rupture of the cyst, and the verity of the diagnosis established by post-mortem examination. I think, therefore, that assertion must be taken with some allowance. An inference that has been drawn is, that when the attack which we assume to be a symptom of extra-uterine pregnancy, namely, the violent pain and colic, supervenes, that rupture of the tube or cyst has occurred. I think that this is not entirely established. Another inference drawn—rather I should say, a pretty definite statement made—is that when the embryo has been destroyed by the electric current, then a foreign mass remains within the pelvis which is a constant source of danger. If the members of the Association will recollect that at the early period at which the embryo dies it very soon becomes dissolved, this apprehension of danger will disappear. Smellie, I think, has stated that if an embryo dies within the uterus before the third month, it is extremely difficult to find its remains at all. I remember a case illustrating this, where an abortion occurred at about the third month of pregnancy, and, though the fetal membranes were perfect, no remains of the embryo could be discovered. It surprised me very much to find that there was a consensus among obstetric authors that after death at that early period, the fetal structures

became dissolved. The assertion that electricity is an entirely untrustworthy agent has, I think, been disproved by the experience of trustworthy observers. Dr. Wathen has made the statement that all extra-uterine pregnancies are probably tubal. I remember a case some years ago in which the tubes on both sides were apparently in perfect condition, and where the attachment was to the ovary. Dr. Vander Veer's case recalls to my mind an interesting one I saw some years ago where, I must admit, the diagnosis has not been perfectly established because the patient did not die. I was called twice in sudden emergencies. The patient had all the classical symptoms of extra-uterine pregnancy; and that was the diagnosis I made. The last attack was so severe, and the prostration so extreme, that I gave an unfavorable prognosis. The woman recovered and was living at least a year afterward. I found, on examination, a mass in one of the iliac regions. I assumed that the tube or sac did rupture, and she gradually recovered from it just as Dr. Vander Veer's case did. Suppuration of the cyst is something that does not so frequently occur at the early age of the embryo at which the cyst ruptures. Dr. Hoffman speaks of that as a source of great danger. The cases on record proving that are so few, I think there will be difficulty in establishing that result as a source of grave danger.

Dr. Joseph Price, of Philadelphia.—I am delighted that this unique report should provoke such a lengthy and thorough discussion; the debate indicates that a refinement of surgery is going on in this direction, and will continue to go on in the hands of many more operators than in the past. Removal is now accepted as the only safe and sure treatment. There are a few points, in the discussion, I wish to touch upon. First, as regards the diagnosis. Scanty or delayed periods are both exceedingly common in a variety of pelvic diseases. Deficient menses are wholly unreliable as a means of diagnosis in extra-uterine pregnancy. Again, you will find a delayed period of one or two weeks in small tumors. It is exceedingly common to find masses on both sides, and even extra-uterine pregnancy on one side and a tumor on the other. You will find an abundance of reported cases to substantiate this statement. Take these three cases alluded to, operated on in the same week. Bantock removed an extra-uterine pregnancy on one side and a pus tube on the other. Another case by Edis—ectopic gestation on one side and a small ovarian cyst on the other. This has been common. Only recently I have removed an ectopic gestation sac on one side and a diseased tube on the other. The indications were clearly for sudden interference simply because there was a suspicion of ectopic pregnancy: paroxysmal pain, hemorrhage, collapse. I was correct, but it was

simply a guess, I must say. Some time ago a case of this character came into my hands: A gentleman had seen the patient, and diagnosticated hematocele; he was present at the operation and asked what I was going to remove; I replied, "one of twelve things." I will call your attention to some few points in regard to symptoms, the intraperitoneal hemorrhage, and what becomes of the fetus. I have recently had a conversation with Formad in regard to these questions, *i. e.*, as to how these cases die. Formad's cases die from rupture, from shock. There is much more hemorrhage in his cases than in the cases that go into the hands of the surgeon. Fothergill says, a swoon often saves the patient from death. This woman had repeated hemorrhages, the history was clear, and I found the placenta and membranes. This woman had just lived along and was anemic and faint. Formad tells me that the abdomen is found full of blood. They die at the washtub, die hanging out clothes, die before they get to the door. Usually none of them have been seen by a physician. What becomes of the fetus in Formad's cases? I asked him the question, What becomes of the fetus? He said, "I find it now, oftener than formerly. The other day I found one sitting up on the pancreas. It had been washed up there." In Mr. Tait's first two cases he failed to find the fetus. Both made tedious recoveries. Here is a solution for Mr. Tait's not finding the fetus. In the case I speak of, in which I was operating for some one of ten or twelve things, I flooded the abdomen until the water came back pure and clear; but as there had been so much débris I used a second pitcher, flooded again, and washed out a little boy. I am satisfied that the peritoneum would have taken care of this, but the recovery would have been tedious.

Errors in diagnosis are exceedingly common, so much so that I myself do not venture to give a positive opinion, because I find such a variety of troubles in the pelvis. I think Dr. Montgomery is the last man in Philadelphia to put a battery and not an operating bag in his buggy when called to such a case, whether for primary or secondary rupture. I think in every case he would use his persuasive powers to induce a patient or attending physician to permit an operation.

Destruction of the fetus: referring to a report of one of the colleagues of Dr. Rohé, I will allude to the celebrated Chadwick case. There was some doubt about the condition, a lengthy discussion took place regarding it, and this case is worthy of consideration. A number of Boston men saw the patient. Electricity was finally used and the woman barely lived. Finally, the fetus made its exit by the bladder; and this was an electrical case! It finally passed into the hands of a Washington physician. I desire to refer to this man's

work recently reported. He gives his experience with myomas. Some cases could tolerate a current of only four milliampères. Another case: the hospital staff diagnosticated a fibroid in the anterior wall of the uterus. The case left the hospital, but returned in twenty days in active labor. Before she left the house the first time she received fifteen milliampères a number of times, with some fancied improvement. She left the hospital on the fourth of the month and returned on the twenty-fourth, when she was delivered of a living fetus. This case is worthy of some thought and consideration.

In regard to how and when to operate, I hold there is but one time to operate—that is, primarily, if the history is a clear one, as it is in many cases; but it is always clear for the main indication—to save a life. It matters not whether it proves to be a ruptured pregnancy or a ruptured pus tube. I differ with Dr. Vander Veer. That mass should come away; it will behave badly; that woman is not safe. It is liable to a variety of changes. I have demonstrated to my own discomfort in the last three days, just how an ovarian cyst may behave. It grew to forty or fifty pounds and pressed upon the kidney until that organ was destroyed. If that cyst had been removed when as large as an orange, a life would have been saved. If we wish to have a series of one hundred consecutive cases without a death, we must operate early. If we wait until the eleventh hour we will have a mortality of not less than ten per cent. In a variety of peritoneal troubles we can have a peritonitis or collapse like that of a ruptured tubal pregnancy. The operations are exceedingly trying; there is no doubt about that. They will test all our surgical ability and knowledge. It is common to open the bowel. A number of cases of death on record were due to rupture of the bowel. It is surprising how often you will find the other tube useless. It should be removed; it will add very little, if any, to the risk of the operation. The most thorough irrigation and drainage should never be omitted. It is surprising the quantity of débris and blood it will remove in these cases. All the early recorded cases of early diagnosis and cure by electricity are wholly worthless and unreliable.

Dr. Thomas's record I consider about worthless, so far as early diagnosis is concerned. The Chadwick case amounts to nothing. The woman made a very narrow escape from death, and the fetus sloughed its way into the bladder or vagina. The cases reported in Philadelphia as successes are still ill—those that lived, and probably some of us will have an opportunity to report those cases yet. I think in a few years surgery will settle this question of diagnosis and treatment of early recorded cases. The cases will go into the hands of surgeons, who, with

the records of the old diagnosis and treatment, and with the presen specimen in their hands, will settle this question.

Dr. Vander Veer.—I would like to make just one statement. Dr. Price does not disagree with me. In the case Dr. Davis wrote me about, I said to him three months after the case had progressed toward recovery: "Better operate now." He said, "No, she is so opposed to the operation." I said, "I am fearful the case will give you future trouble." A case bearing upon this point occurred in my own city: a lady, five years ago, was supposed to be pregnant; she went on to the full time and, though the enlargement was marked, still she did not give birth to the child. The friends consulted me two years afterward; I said I considered it a case of extra-uterine pregnancy, and I believed an operation was advisable. Two years ago Dr. Hailes said to me, "I have seen Mrs. B., and I believe she is having an abscess," which proved to be the case. The doctor was much elated to remove first a rib, and then a portion of the skull. Three months ago he brought the patient to the hospital and then proposed to dilate the opening through the rectum, which he finally did. He then removed nearly one-half of the skeleton that still remained, with a mass that seemed to be the placenta. She died in two hours afterward, of shock.

I saw Mr. Tait do two operations. He said, in the first case: "I have a case I believe to be hemato-salpinx;" made his usual rapid incision, had his finger in there but a moment, looked up, continued still manipulating with his finger, and said: "Gentlemen, I am wrong in my diagnosis; this is a case of extra-uterine or tubal pregnancy." He enlarged his incision, and was fortunate in saving the fetus. The amount of hemorrhage was to me simply appalling. He washed out the peritoneal cavity, using hot water, placing her in different positions; closed up the wound, put in a large drainage tube, and I had the pleasure of watching that patient go on to recovery. The moment he got his fingers in, the amount of clot convinced him he had a case of extra-uterine pregnancy.

Dr. Price.—A word calling our attention to Mr. Tait's cases stimulates me to speak of two cases recently in my own experience. One is for all the world like the one reported by Dr. Hoffman. She had a child at the breast. At six months the menses appeared, and remained irregular for five months. She missed the twelfth and thirteenth months, but she was still nursing. She called for some doctor in the public service, and I sent one to see her. He said that the woman had paroxysmal pain, and thought it was extra-uterine pregnancy. I returned with him and found the woman quite comfortable. The pain had ceased, but she was decidedly anemic. I found nothing

but an indistinct fulness on the left side, though on the right was a well-defined hardness. The patient, a very destitute woman, had not even a bed I could place her on. I called a carriage and sent her to the hospital. I operated at nine o'clock the following morning. She had a temperature of 102° and a pulse of 120. The other case had paroxysmal pain. She was an active, hard-working colored woman. Her suffering was excessive. She also had a delayed period; temperature 103°, pulse 130. To me one was as clearly extra-uterine pregnancy as the other; delay was not justifiable in either case. I found in one extra-uterine pregnancy on one side and pyosalpinx on the other side. In the other there was peritonitis, and in the cavity there were lymph and a quart of muddy fluid; there was pus pouring from the tubes, like an acute gonorrhea, but there was no ectopic pregnancy. The indication was precisely the same, the removal of both appendages. Both got well.

Dr. J. H. Carstens, of Detroit, Mich.—I agree, in part, with some of the gentlemen who have spoken. Some cases, it is said, you can not operate on because the patients object. It is not the patients who object so much as it is the attending physician. He does not care about an operation and rather opposes it. The great point is to educate the practitioner to endorse the view the surgeon takes. I believe in some of these cases that electricity is good, but I have never used it when I did not constantly dread that during the use of the current the sac would rupture. It seems to me that when you are using the electricity you get a contraction of the muscles and other structures around the sac, and you are likely to rupture it at that time. There is no doubt but that it will destroy the fetus in some cases. I have seen it do so. The only operation of extra-uterine pregnancy I have had was a case that came into my hands last spring, and had been in the hands of a number of irregular practitioners several months, with the history of sudden rupture, shock, etc. The woman was much reduced, the abdomen enlarged, and a great deal of inflammation present. She was so much reduced I did not dare to operate. I tried to stimulate her, and I did until I thought it was time to operate, when suddenly she had another explosion, although she must have been advanced four months. I made the abdominal incision and, on account of the intense swelling and congestion, cut down on the median line. I struck the placenta. There was quite a copious hemorrhage. Then I went into the cavity, and found the fetus, which I considered to be about four months. I removed it, filled up the cavity with antiseptic gauze, and partly sewed up the abdominal wound. It was a large sac, adherent to the intestines in

every direction. That was a case where it was impossible to remove the sac, as I could not control the hemorrhage. I simply had to leave it to come away by sloughing. The woman, however, died of shock within five or six hours.

Dr. X. O. Werder, of Pittsburg, Pa.—I have been very much interested in the paper read, and in its discussion. I feel that I cannot add very much to what has been said. My experience has been limited to two cases, both of them instructive to me. One was almost a typical case. There was sterility. Shortly after marriage she had pelvic trouble and was sterile seven years. The last menstruation, which had always been regular, was about two weeks overdue. Menstruation came and with it cramp-like pains, which returned every three or four days. When I saw her I found, upon vaginal examination, an elastic mass, globular in shape and very tender, which I diagnosticated an extra-uterine pregnancy. The operation was postponed because her husband was away, and the patient refused to have anything done until he should get home, which caused a delay of four or five days. When the abdomen was opened it was found full of black, coagulated blood. There never had been any symptoms of collapse. The rupture of the tube had never been diagnosticated. I suppose the reason was that the hemorrhage was a mere gradual oozing. The fetus was not found, but there was no doubt about its being an extra-uterine pregnancy. Contrary to Dr. Price's experience in regard to cases in which the fetus was left in the abdomen, the recovery was not tedious. The patient was out of bed on the eleventh day, and is now in better health than before.

The second case is similar to the one reported by Dr. Price. The patient had two children; the youngest child was sixteen months old at the time of operation. The patient had never been well since the last confinement. Ever since, she had been suffering with paroxysms of pain. Had been menstruating with regularity for eight or ten months before; menses were never delayed, always perfectly normal, though somewhat profuse. I was called in at one of these paroxysms of pain, and made a vaginal examination, discovering a mass to the left of the uterus which was large, elastic, and extremely tender. It never occurred to me that it was a case of extra-uterine pregnancy. I diagnosticated some tubal disease, either hydro- or pyosalpinx. Operation was postponed until after the next menstrual period. The afternoon before the operation she came to my office in a carriage, on her way to the hospital. I found no change in the mass, except that it had become somewhat larger. She was then four or five days after menstruation, which was perfectly normal. Upon entering the hospital that evening

she was almost collapsed. I did not see her until the next morning, when she had rallied to some extent. When I opened her I found it to be a case of extra-uterine pregnancy, with rupture of the tube. Rupture of the tube must have occurred in the carriage, probably from the jolting. Her convalescence was rapid. The fetus was not found. The patient made an excellent recovery and, according to her last report, she is pregnant again.

Dr. McMurtry.—I did not attempt in my paper to portray the diagnosis and symptomatology of ectopic pregnancy, or to describe the operative technique. I simply laid before the Fellows a clinical experience, hoping they would elect such points for discussion as were deemed most important. I think it may be stated, without fear of contradiction, that previous to the time of rupture no diagnosis of extra-uterine pregnancy can be relied upon. If I were to see at the operating-table such diagnosis verified, I would simply regard it as a happy guess. Consequently, all data as to the therapeutic resources of electricity previous to rupture are worthless. And, moreover, I claim that the diagnosis of extra-uterine pregnancy after the abdomen is opened is not easily made. The literature of extra-uterine pregnancy contains many reported cases which will not bear close scrutiny. Hematoma of the ovary and hematosalpinx may be pronounced, after hasty examination, to be tubal pregnancy. Previous to rupture of the tube, and previous to operation, the diagnosis of this condition is never absolute and demonstrable. One common and flagrant deception in pelvic operations is that tendency to self-deception, where one before an operation pictures several possible conditions, and after the operation retains in mind only the one found to exist. In this way, a doubtful diagnosis in time becomes to the operator's mind a positive diagnosis.

Allow me to emphasize what has been said in contradiction of the alleged value of electricity in these cases. If, before or after rupture of the tube, the growth of the fetus is arrested, a mass with universal adhesions and capable of suppuration is left within the pelvis. Take, in illustration, the case mentioned by Dr. Vander Veer. The course he advised (immediate operation) would have been an uncomplicated operation; whereas, there remains now a morbid growth with adhesions, prone to suppuration and consequent dangers. I believe increasing experience will demonstrate beyond question that electricity cannot be relied upon for good and permanent results in these cases. Moreover, in skilled hands, I believe abdominal section is less dangerous than the use of electricity. I would call attention to a practical point brought forward by Dr. Price. He has told us of a number of cases in which he found tubal pregnancy upon one side, and pyosalpinx upon the

other. This indicates plainly that the morbid condition of the mucous lining of the tubes, which favors extra-uterine pregnancy, is symmetrical, and that in operating, as a rule, the appendages on both sides should be removed.

Referring to that part of the discussion dealing with suppuration of the fetal mass, I would state that we may have a suppurating focus resulting from extra-uterine pregnancy, without extrusion of definite parts of the fetus. Nor is it the size of the mass in the pelvis which indicates danger, but rather the nature of the deposit there. Abscesses may open into the rectum, bladder, or vagina, as a result of extra-uterine pregnancy, and no fetal bones protrude. Extra-uterine pregnancy is at the bottom of a large class of pelvic abscesses.

In conclusion, I would again urge the necessity of early operations. Notwithstanding the difficulties attending absolute and differential diagnosis, the indications for abdominal section are plain; and the dangers attending exploratory incision are not to be compared with the increased risk resulting from peritonitis, adhesions, suppuration, and systemic infection. The difficulties and dangers in the case I have reported were increased an hundred-fold by the prolonged delay before operating.

TREATMENT OF THE RUPTURED PARTURIENT UTERUS, WITH REPORT OF TWO CASES.

By CHARLES A. L. REED, M.D.,
CINCINNATI.

Treatment of the ruptured parturient uterus has not as yet been formulated into definite principles, although Trask, after his first critical study of the subject in 1848, earnestly contended for some rule which would serve as a guide to the practitioner in this unfortunate emergency. It is true that he made an attempt at framing rules which would serve this important end, and did, indeed, take a step in advance of his time by clearly indicating his preference for abdominal section in this class of cases, stating that "neglect of this mode of delivery augmented the mortality from this accident." Yet, clear as Trask's convictions manifestly were on this subject, he could not divest himself of the conservatism of his era, and presented the conclusions of his classical research in the following words:[1]

"1. When rupture occurs, where there is no disproportion between the pelvis and the head of the child, and the head remains in the cavity of the pelvis, the child being ascertained to be living, the careful employment of the forceps should be attempted; if the head retreats, perforation is to be preferred. An impaction of the head in the hollow of the pelvis would, of course, require the use of the perforator.

"2. Should the fetus have escaped into the peritoneal cavity, the feet may be sought, and the child delivered by turning, provided there be a pelvis beyond doubt ample, a head of moderate dimensions, and the edges of the uterus uncontracted, or the rent confined chiefly to the vagina.

"3. But as contraction of the uterus almost uniformly takes place upon the escape of the child, it will prove an obstacle to almost every case of escape of the child in which the vagina is not also involved to a very considerable degree. The performance of gastrotomy will then offer the best chances of success."

[1] American Journal of the Medical Sciences, 1856.

Although the foregoing conclusions were promulgated over thirty years ago, and although the researches of Jolly and Harris have since confirmed the value of abdominal section in these cases, I am convinced that the practice of to-day is practically in accord with the teachings of Trask. My warrant for this statement is not found in the details of reported cases, which are generally furnished to the journals by progressive surgeons, but it is found rather in the fact that, with few exceptions, the text-books on obstetrics teach practically the same principles of practice which were current before the modern triumphs of abdominal surgery.

Parvin, one of the latest as he is one of the ablest of our obstetric writers, after alluding to gastrotomy in these cases, adds:[1]

"But it does not follow that abdominal section should be made in all cases of uterine rupture when the fetus can be readily delivered through the normal passage, but only in those in which there has been hemorrhage or escape of amniotic fluid into the abdominal cavity; even in the latter, good results have been had in some cases by washing out the peritoneal cavity through the rent with an antiseptic fluid, and securing drainage."

Lusk, in connection with the report of a recent case, says:[2]

"When the child can be removed through the natural passage without increasing the extent of the rupture, and the latter is confined to the lower segment, laparatomy is of doubtful value. In many such cases recovery, *quoad vitam*, has been obtained by the employment of antiseptic irrigation and filling the gap with antiseptic gauze. . . . . The plan of treatment recommended is, of course, only effective where no infection of the abdominal cavity has taken place at the time of rupture."

It is but a few years since Leishman's work was on the text-book list of nearly all the American medical schools; in many instances it still holds its place, and, consequently, it has exerted, and still exerts, an important influence in moulding the practice in this country. His summary of treatment is, therefore, of extreme importance. I believe that he fairly epitomizes the treatment—the average treatment—of to-day in the following words:

"On the whole evidence we must pronounce in favor of gastrotomy when the child is in the peritoneal cavity; of turning when it has remained in the cavity of the uterus; and of the forceps or perforation when the head can be easily reached within the pelvis."

[1] Science and Art of Obstetrics.

[2] New York Medical Journal, September 14, 1889.

These extracts from current authors are presented to show that there has been but little progress in the management of these cases since the days of Trask, and to give a brief *exposé* of a treatment which I do not believe to be in harmony with the well-established canons of modern surgery.

The points at issue can best be studied by responses to queries which occur, with practical pertinence, to the mind of the unfortunate consultant in cases of ruptured parturient uterus.

What shall be done with the child which is yet within the ruptured uterus?

Most cases of rupture of the uterus occur in vertex presentations, and the first objective evidence of the occurrence of the accident is recedence of the head. Contraction of the longitudinal fibres is the next phenomenon, and the head, following the direction of least resistance, is forced into the rent. In some cases, however, instead of contraction of the longitudinal fibres, inertia supervenes, and labor, for the time, comes to a standstill. If, happily, the rent be now incomplete, the timely inertia arrests the extrusion of the head and saves the peritoneal cavity from invasion. It is precisely this latter contingency which should dictate the treatment: *Apply the forceps and deliver at once.*

The usual alternative of the treatment is turning, as advised by Leishman. It is against this alternative that I desire to enter my protest. It should be remembered that at this juncture, as a rule, the differential diagnosis between complete and incomplete rupture cannot easily be made. In this case we should always act upon the presumption that the rupture is incomplete; and our practice should be adopted with reference to saving the peritoneum. In the cases of Trask, Jolly, and Harris, turning figures as one of the primary causes of rupture. Ought we, therefore, in a case in which at least partial rupture has already weakened the uterine wall, to adopt a manœuvre which has been known to produce rupture of the uninjured wall? Clearly the proposition is as irrational as the practice is disastrous.

But there are instances in which delivery by the forceps *per vias naturales* is impracticable—*e. g.*, cicatricial bands at the internal os, and extreme kyphosis, as in the recent case of Lusk already alluded to. What should be done under such circumstances? I contend that all efforts at delivery by any expedient whatever should

be at once abandoned. The attempt at applying the forceps should not be made if pelvic contractions or other insurmountable obstacle to delivery be manifest; and if a single application of the forceps demonstrates the impracticability of delivery by that method, the verdict should be accepted at once. Repeated efforts at applying the forceps should be avoided, as each effort will do more or less damage to an already damaged uterus, and may thus interfere with the resolution of that organ. Turning should not be thought of. At this juncture either craniotomy or embryotomy has been practised. The ascertained mortality of the procedure but confirms the condemnation which a rational contemplation of it furnishes. What, then, should be done? I advise that the case be at once submitted to abdominal section, and delivery effected either by incision of the uterus, if the rupture be incomplete; through the (if necessary) enlarged rent, if the rupture be complete; and that the uterus be then treated either according to the method of Sänger or Porro, as may be indicated.

What shall be done in cases of rupture of the uterus in which the child and afterbirth have been successfully delivered by the natural passage?

The first thing that ought to be done after successful delivery by the natural passage should be to determine, by cautious and gentle manipulation, whether or not the case be one of complete or incomplete rupture. If found to be incomplete, the case should be treated by antiseptic irrigations. I do not employ chemical antisepsis in aseptic surgery, but in this case we have to deal with an open and absorbent surface, and, very shortly, with the products of putrefaction in contact with that surface; hence it becomes eminently proper to employ either a phenolic or a mercuric bichloride solution.

But in the event that the tear is found to communicate with the peritoneal cavity, we are at once brought face to face with one of the moot questions connected with the subject. It is just here where Parvin asserts that abdominal section would not be justifiable unless "there has been hemorrhage or escape of amniotic fluid into the peritoneal cavity;" and it is precisely in these cases that Lusk tells us that "recovery *quoad vitam* has been obtained by employment of antiseptic irrigation," etc., but warns us that this plan of treatment is "only effective where no infection of the abdominal cavity has taken place at the time of rupture." How are we to

know whether "there has been hemorrhage or escape of amniotic fluid into the peritoneal cavity?" By what process can we determine whether or not "infection of the abdominal cavity has taken place at the time of rupture?" Clearly, the only rational recourse at our hand is exploratory incision, and I may go a step further, and say that exploratory incision, in the ordinary acceptation of the term, falls far short of the requirements of the case. Those of us who are familiar with making the toilet of the peritoneum after a bloody ovariotomy, know with what facility even large clots may elude the finest tactile sensibility. It is manifest that in cases such as that under discussion, nothing short of copious flushing can at once establish the diagnosis of intra-peritoneal extravasation, and rid the cavity of the offending stuff.

In illustration of the importance of abdominal section under these circumstances, I beg leave to call attention to the following case:[1]

Case I.—Mrs. D., æt. twenty-eight, had borne three children in rapid succession and without difficulty. When seized with her fourth labor, she was compelled to rely for a time upon a midwife, as her attending physician was temporarily absent. The case was one of shoulder presentation, one arm having come down. When the physician arrived, the patient had been in active labor about three hours. Pains were excessive. Ten minutes later symptoms of shock were suddenly manifested, the presenting shoulder receded, and there was relaxation of the soft parts. With commendable presence of mind the arm was replaced, the forceps applied, and the child delivered alive. Delivery having been effected, hold was retained on the cord, and, as was then thought, a successful effort made to deliver the placenta.

I arrived five hours after the accident. With the assistance of Dr. Smolly, the abdomen was opened with an incision five inches in length, and a laceration of the uterus was found, four inches in length and involving nearly the entire anterior wall. In the rent a piece of placenta about the size of three fingers was found. This had been torn off, probably during the efforts at dislodgement. No clots of consequence were found in the abdominal cavity. The peritoneal rent corresponded with the muscular tear. It was not so extensive as that in the other case which occurs in this report. The edges of the wound were relieved of all fringes of tissue, carefully approximated, and closed with twelve deep interrupted sutures of silk. The peritoneum was then closed by continuous catgut suture, and the abdominal incision closed in the ordinary way. The case made an uninterrupted recovery.

If there is any case at all in which a reasonable presumption of non-contamination of the peritoneum would obtain, it would certainly be in this one; yet section revealed the existence of an alto-

[1] Lancet-Clinic, 1888, vol. lx.

gether unsuspected condition, which, had it not been removed, would in all probability have induced septic peritonitis and death. But it is not alone to remove existing infection of the peritoneal cavity that abdominal section should be done in these cases; it is to close the rent, and thus prevent, if possible, the migration of the germs of putrefaction from the cavity of the uterus into that of the peritoneum. It is true that this cannot be done in all cases, tears low down in the posterior wall being beyond the range of operation; but, when it can be done, the edges of the wound should be carefully trimmed, approximated, and securely closed by the Czerny-Lembert suture.

What shall be done in cases in which the child has been delivered, but in which the placenta has escaped into the peritoneal cavity?

This complication occurs with relative frequency, and when it does occur it is the next in order of events to claim attention. In this class of cases we have a condition in which it would seem that removal of the placenta could be readily effected through the rent; but that it is, on the contrary, a very difficult manœuvre, is shown in the following case, which, when I was called to it, presented exactly the problem indicated in the question at the head of this paragraph. I take the liberty of presenting the case in the language of Dr. Shaller, the attending physician, as employed by him in his report to the Cincinnati Academy of Medicine:[1]

"On Saturday, April 29, 1888, at 6 30 A.M., I was called to see Johanna M., in labor with her fifth child. She was a well-built, strong German woman. I learned that pains had set in at eleven o'clock Friday night, a midwife being called in at 4 A.M., though after her arrival no uterine pains occurred.

"The abdomen, while tender to pressure, was not abnormally so, and the pulse at 100 was good and full. Digital examination revealed the head engaged in the superior strait, clearly defined in its entire circumference. There was no flooding, and abdominal pains prevailing, I gave morph. sulph. gr. ¼ hypodermatically, and left the patient. Returning within an hour, I found her bleeding freely.

"Examination at this time showed that the head had receded. Introducing my hand, and finding the feet within easy reach, I brought them down, and the child was delivered in one hour, with bearing-down pains. The abdomen being tender, I forbore external pressure, and in this way failed to observe uterine contractions. The child was dead when born.

"After cutting the cord, I waited a short time for the expulsion of the

[1] Lancet Clinic, 1888, vol lx. p. 515.

placenta. There being no pains, I thought to take hold of the cord in order to make traction, but there was no cord to be found. Examination of the bed failed to offer any clew to the missing cord, and a digital vaginal examination met with no better success. The hand was then passed into the vagina; the cervix uteri could not be defined; and, on passing the hand higher, it suddenly seemed to have entered into an infinity of space. Never before had I realized the magnitude of the abdominal cavity, for, normally, the hand while in the vagina is grasped and limited by the surrounding tissues. For the hand to pass suddenly from a confined area into a boundless region, under the above circumstances, produces rather a weakness in one's knees. To the right and anterior the contracted uterus was felt. The placenta could not be found; and giving the patient two drachms of fluid extract of ergot, I left to procure assistance. I fortunately succeeded in finding Dr. C. A. L. Reed, who proposed abdominal section for the removal of placenta and clots."

The following description of the operation is in the words of Dr. Reed:

"The operation was actually begun about 1 P.M., four hours after the discovery, and nine hours after the occurrence of the rupture; Drs. Shaller, Wenning, Mayer, and Marsh present and assisting. An incision was made about five inches in length. The uterus was found to extend well up to the umbilicus.

"While making a preliminary exploration, the cord was found; taking it as a guide, the placenta was easily found lying low down in the pelvis and back of the uterus. It was now removed, and with it a number of clots. The abdomen was carefully cleansed. Search was now made for the rupture. The position of the placenta, and the knowledge that the majority of such ruptures occur in the posterior aspect of the organ, attracted attention in that direction. The apparent homogeneity of the structures, whether felt through the vagina or through the abdominal incision, led to further confusion. It was not until Dr. Shaller introduced his hand into the vagina and thrust his finger through the rupture that the latter could be made out. It was found on the anterior surface of the uterus, extending longitudinally from a point midway through the cervix, and involving a part of the anterior vaginal wall. This description applies only to the rupture as it existed in the muscular structure; the peritoneal rupture began coincidently with the upper angle of the deeper rent, but extended off to the left, involving the anterior layer of the broad ligament and a portion of the serous covering of the bladder, leaving quite denuded an area of muscular tissue, triangular in shape, three and a half inches in perpendicular, with a base quite two inches in extent. This ragged curtain of peritoneum was turgid with extravasated blood, held firmly in the meshes of the yet adherent subserous cellular tissue.

"Two lines of sutures were employed: one deep, involving the muscular structure; the other superficial, involving the peritoneum. The sutures in the muscular tissues were of sterilized silk, interrupted, and twelve in number;

the peritoneal sutures, also of sterilized silk, were thirty in number, and, with the exception of the last half-dozen applied low down in the pelvis, were after the Czerny-Lembert method. Suturing low down in the pelvis was extremely difficult, so that the double-in-and-out stitch or the so-called 'seroso-serous' suture could not be applied, the simple interrupted suture being substituted. The abdominal cavity was again cleansed, and the incision closed in the usual way, a drainage-tube being left in position."

"*After-treatment.*—After the operation the pulse never went below 110, the patient resting comfortably the first twelve hours, after which, severe pain and vomiting setting in, I gave morph. sulph. gr. ¼ hypodermatically. On Sunday, twenty-four hours after the operation, the pulse was 130; temperature 101°; eructations frequent, no stool or flatus; the urine was drawn twice, after which it passed without pain and normally. There was no bloody discharge from the vagina; the abdomen was tender and tympanitic. Hot-water injections were given every three hours. The drainage-tube was emptied of blood and cleansed with sulphurous acid solution (one-fifth) every six hours. Ice, iced milk, and brandy were given freely.

"Thirty-six hours after the operation vomiting set in, with increase of pain and tympanites. The second dose of morph. sulph. was administered. Calomel ½ grain every half hour. Temp. 102°; pulse 140. Slight bloody discharge from vagina. A rectal injection of pure glycerine, later hot water, and still later the introduction of a rectal tube, failed to produce stool or wind. Grains xx of calomel were given in one dose. Forty-eight hours after the operation the extremities became cold, pulse feeble, slight delirium, tympanites very great, no stool. The patient died Monday, at 6 P.M., fifty-four hours after the operation, from the effects of peritonitis."

This case is one which demonstrates the serious nature of the injury to which the uterus is subject by rupture. There can be no doubt that the parenchyma of the organ sustained serious damage by the contractions which ultimately provoked the rupture, and that this damage existed in the fibres of the uterus in an area much more extensive than that involved by the tear. I have often felt that I should have done a Porro operation in this case, but I was deterred by two considerations, viz.: first, all of the damaged tissue could not be removed by supra-vaginal amputation of the uterus; and, secondly, I did not go prepared to do the latter operation. It has occurred to me that the long retention of the placenta and clots before the operation had already given rise to peritonitis, which proved to be the fatal factor in the case.

What shall be done in cases in which the child, or the placenta, or both, have escaped into the peritoneal cavity?

It would seem that the duty of the practitioner is clear under these circumstances. Yet, when he turns to our authors, he finds

himself led in both directions at once. He finds himself taught that abdominal section should be done in cases of evident contamination of the abdominal cavity; he is told that the operation should not be done in all cases in which "the fetus can be readily delivered through the natural passage;" and he is reminded of recoveries from antiseptic irrigations and antiseptic gauze packs; and then he wonders whether, indeed, it be possible to gain direction out of indirection. He is left entirely on his own responsibility, and to solve the problem strictly on its merits.

The first fact to claim attention is that the uterus, in the act of rupturing, must have discharged some blood into the peritoneal cavity; and the next is, that the child and placenta must have carried with them more or less of detritus. Amniotic fluid may have found its way into the abdomen. These considerations alone should prompt abdominal section—if not for the purposes of delivery, yet for the purposes of cleanliness. If the abdomen is to be opened for the purpose of flushing, why not effect delivery through the incision at the same time? There are other considerations prompting to this course. The advice of Parvin, that abdominal section should not be done when the fetus can "be readily delivered through the natural passage," is liable to a dangerous interpretation at the hands of practitioners who are anxious to evade the responsibilities of the knife. With them "ready delivery" is liable to imply not merely the introduction of the hand, which is not devoid of danger; nor the mere grasping of the presenting part, which is not always easy; nor the mere turning in the abdominal cavity, which is always hazardous; but a test of the tractile power of the operator and the resistant power of the patient. In this way patients may be subjected to a hazard which the knife in the hands of a skilful operator could not incur.

But we are "informed" that good results have been had in some cases by "washing out the peritoneal cavity through the rent with an antiseptic fluid and securing drainage;" and, again, we are told of recoveries by "employment of antiseptic irrigation and filling the gap with antiseptic gauze." I will not dispute the fact of such recoveries, for they are well authenticated, yet I cannot but concur with Harris that every such recovery is to be looked upon as a misfortune, tending, as it does, to stimulate others to persist in a practice that is essentially unscientific.

The only danger to life, however, does not come from extra-peritoneal infection which may have found its way into the cavity at the time of rupture, or that may have been carried thither by the child, or the placenta, or both, nor yet that may have subsequently traversed the wound in the form of lochia. It must be remembered that the parenchyma of the uterus has sustained serious damage: (1) by its own violent contractions; (2) by the rupture; (3) may be by the use of the forceps; (4) by the escape of the child through the tear; (5) by repeated digital examinations; (6) by the introduction of the hand; (7) by efforts at traction to determine the feasibility of delivery *per vias naturales;* and (8) by the forcible withdrawal of the child through the rent. All these influences may have been brought to bear upon a uterus before the surgeon is called. What prospect has such a damaged uterus for resolution? Is it not much more liable to become the breeding-ground of septic germs that may have originated in the first instance at the placental site? And, if we thus have established a suppurative parenchymatous metritis, is not the death of the patient from septicemia almost a foregone conclusion? In the light of these considerations extirpation of the uterus is clearly indicated, and should be recognized as a definite probability in undertaking abdominal section in these cases.

The conclusions to which my brief studies and limited experience force me are as follows, viz.:

1. In cases of rupture of the uterus, with the head presenting, delivery by forceps should be attempted, but should be abandoned if not found easily practicable. Turning should not be undertaken, but the case should be at once recognized as one for either the Cesarean or Porro operation.

2. In cases of ascertained incomplete rupture, treatment should be by antiseptic irrigations and rest.

3. All cases of ascertained complete rupture should be submitted to abdominal section so soon as the condition of the patient with reference to shock will admit, for the following purposes, viz.: (1) to explore the abdomen; (2) to remove all foreign bodies; (3) to cleanse the peritoneum; (4) to close the rent if the labor shall have been short and the uterus not seriously damaged; and (5) to remove the uterus if the labor shall have been long and the uterus seriously damaged.

DISCUSSION.

Dr. J. H. Carstens, of Detroit, Mich.—I never met a case of rupture of the uterus, but I made up my mind long ago, that this was the correct form of treatment. I am glad that Dr. Reed has brought it up. I think we ought to endorse it. In this way the patient is almost certain to get well if the operation is done early and under antiseptic precautions.

Dr. Joseph Hoffman, of Philadelphia.—I have had one case of rupture of the uterus that I caused in turning, and the woman died. Right there you have a text that will preach a sermon such as Dr. Reed has preached. The whole subject of ruptured uterus and the questions of treating it can be written about and talked about as long as we please, and the end will be, if the rupture of the uterus is a serious one, the woman will die in nine cases out of ten. The doctor raises the query, How are we to know whether the peritoneal cavity is infected, and how are we to be prudent and prevent antiseptics from getting into the peritoneal cavity, where they are as likely to kill the woman as to destroy the infection? The only satisfactory way is to go through the abdominal wall, by Cesarean section or the Porro operation, which latter I think is preferable.

Dr. Joseph Price, of Philadelphia.—The paper is too valuable to pass without cordial endorsement. I simply arise to express my appreciation of the contribution, and to say that I fully agree with everything Dr. Reed has said. I have seen two cases, in consultation. In one we had an excellent opportunity to save a life by surgery. This was some years ago, and I urged abdominal section, but was not supported by the physician in attendance, who disagreed with me and called someone in who established vaginal drainage, and lost his patient. The abdominal cavity was found full of fluid. The other case was in the practice of Dr. M. Price. He was called to see a woman near by. She was pulseless when he saw her. The rent was posterior, to the left, and about eight inches in length; the placenta and cord were entirely in the abdomen. The fetus had partly escaped into the peritoneal cavity, the head having passed through the tear. He did a very prompt Porro, but she died some twenty minutes after she was placed in bed. It was my impression that transfusion would have saved this woman. It shows the importance of being prepared at the time of a Porro to perform transfusion. Opium itself sometimes kills these patients. Many of the patients would die if we followed irrigation and drainage with opium. I desire to say that I fear opium very much in abdominal work.

Dr. W. H. Wathen, of Louisville, Ky.—In May, 1887, I read before the Section of Obstetrics and Gynecology, at the meeting of the American Medical Association, at Chicago, the report of a case of rupture of the uterus, and recommended nearly the same treatment advocated by Dr. Reed; and I fully concur with his views of treatment. If there is any exception to the rule that requires laparatomy in all cases of ruptured uterus, it would be where the rupture is in the posterior and lower segment of the uterus, extending into the pouch of Douglas, with the child and placenta delivered through the natural channel, and where there is no discharge of blood or liquor amnii into the peritoneal cavity. In this condition the discharge that comes from the uterus would necessarily, by gravitation and by the effort of the abdomen to expel all liquids from its cavity, drain freely through the vagina, and if, perchance, some discharges had entered primarily into the peritoneal cavity, they would drain out. I am not positive in my position as to whether laparatomy is contra-indicated here. But certainly we know from the reported history of these cases, that there are many similar instances where patients have made uninterrupted recoveries without laparatomy. But the indication for laparatomy is positive where the uterus is ruptured higher up, or when ruptured laterally or anteriorly, so that drainage would be imperfect; or where the child, blood, or liquor amnii has gone into the peritoneal cavity. We must adopt the best method of treating the uterus. Should we use the deep and superficial sero-serous suture, or should we amputate the uterus? I think the amputation of the uterus is the simplest, easiest and quickest, and probably future results will demonstrate this to be usually the best, but there are instances where the improved Cesarean section would be indicated. If the uterus had sustained but little traumatic injury except in the rent itself—not a very long one, and in a healthy condition, with a smooth surface that will adhere with readiness—I would commend the improved Cesarean section. I believe the first uterus sutured, when ruptured, was by Dr. I. N. McCormack, of Kentucky, and this was successful. We might consider the question of preventing rupture of the uterus. It is often the result of meddlesome midwifery; at least many cases of rupture could have been prevented. Ergot has ruptured the uterus very often, and it is so unsatisfactory in its results that it ought to be, with the fewest exceptions, eliminated from obstetric practice until the child is born. Just to emphasize this: Not long since I was awakened at two o'clock in the morning by a gentleman who had practised medicine fifteen or eighteen years. In driving me to his patient he said, "I cannot get the uterus to contract; I have given the woman, in the last few hours, two ounces of fluid extract of

ergot." I found the uterus in tetanic spasm; I gave the woman morphine and atropine, hypodermatically, and she was finally delivered of a dead child. The careless use of forceps, and recklessness in performing version cause many ruptures. Not long since, I was called to a case where the doctors had tried to use forceps, and attempted version and craniotomy; the result was a rupture of the uterus and death of the patient.

Dr. X. O. Werder, of Pittsburg, Pa.—I have had the misfortune to see two cases of ruptured uterus—one in Vienna, which was treated by vaginal drainage, and recovered. The second case I saw in consultation. Saw the patient on Sunday morning. The history was, that labor commenced the previous Thursday morning. A physician was called in and told her she would be well in a short time. He remained a few hours, when he ruptured the membranes. Shortly after, she felt something give way, she said, in her side. From that time until I saw her Sunday morning all pain had ceased. The temperature was 102°, pulse 150, and she was very tender over her abdomen. The discharges from the vagina were very offensive; the child was undelivered, the head presenting near the pelvic brim, the cervix not fully dilated, membranes ruptured. I suspected the physician in attendance had given ergot. The child was dead. The question was, what to do. I suspected ruptured uterus, though I could not feel this condition at the examination. That the woman had to be delivered, was evident. I thought the safest way to the mother, the child being dead, was by craniotomy. In this way delivery was accomplished without difficulty. The woman was a multipara and never had very much trouble in her labors, though they had been rather tedious. After the child was delivered we waited a considerable time for the placenta; the uterus had well contracted, but there were no labor pains. I then practised massage over the uterus, but without effect. On digital examination I found the placenta not in the vagina, nor in the uterus, but there was a rent in the left side of the uterus involving the whole lower segment, and extending through the left parametrium and part of the vagina. Through this rent part of the umbilical cord was protruding into the vagina; the placenta was in the abdominal cavity, from which I removed it. I advised a Porro operation, preferring it to simple laparatomy for the purpose of closing up the rent, as the uterus was certainly in a condition of sepsis. Her husband and the relatives objected. The only thing remaining was drainage, through the vagina, of the abdominal cavity. The patient died a few days afterward.

Dr. R. L. Banta, of Buffalo, N. Y.—I did not intend to say anything on this paper, for two reasons: 1st, my knowledge of abdominal

section is limited; 2d, I am in accord with the writer in all he says. I think, however, there is one point in a case that happened in my practice about ten years ago that may prove of interest. That was about the first year I used corrosive sublimate as an antiseptic. I was called in a case where a midwife was attending. It was a neglected trunk presentation. I called in help, and after delivery a laceration of the lower segment of the womb was discovered. The patient recovered, but the amount of corrosive sublimate that I used at that time, as I look back to it, was appalling.

Dr. A. Vander Veer, of Albany, N. Y.—In 1869 Dr. Fonda, of Albany, had a case which I would like to report in connection with this subject. He came to my office about six o'clock one Sunday A. M., saying that he had been called the previous Friday P. M. to see Mrs. B. in her first labor. Had worked all that night with her; also Saturday, and on Saturday night had called in Dr. Boyd, one of our best obstetricians. Dr. Boyd stated there was contraction of the pelvis, and that it would be necessary to turn and deliver. While doing this the patient complained of sharp pain, and stated that something had happened. They both kept at work and finally delivered a leg; then placing a bandage around the hips Dr. Fonda said he pulled with some earnestness and brought away everything but the head. He said that Dr. Boyd had gone home thoroughly tired out and wished I would come with him and see the case. When we got to the bedroom in which the patient had been attended, we found that she had died just a few minutes before—that is, death had taken place while the doctor was on his way to my office. I made a careful examination, found the head in the cavity of the abdomen, and it could be moved about in every direction; the placenta could not be found. I said to the doctor: "I have no doubt that you have a case of rupture of the uterus." No autopsy was allowed. Just a word as to the method of operation in such a case as this. Had the patient been alive I would certainly have done the Cesarean section. When I first heard of the Porro operation it brought the case to my mind, and I said, "This would have been the proper operation to do," and in such cases of contracted pelvis I am firmly of the impression that the Porro operation is the one to be chosen. In the case I have related the doctor stated that he had given Squibb's fluid extract of ergot in full doses. There are cases where rupture occurs when everything is natural, and where it seems very desirable a child should be born in the family. In such cases I believe the Cesarean section should be done, and the mother given another chance. It has occurred to me whether, in such cases, it would not

be wise to trim up the ragged, irregular rent, and close as in the improved Sänger operation.

Dr. Price (after Dr. Vander Veer, who spoke of trimming the ragged margin of rent).—A word in regard to that point. One would scarcely think of closing lacerated or diseased tissue caused by bullet wound without trimming. The same rule holds good in all good surgery. These ragged contused rents should be made clean wounds, that the juxtaposition may be perfect and the healing rapid.

Dr. Reed (closing the discussion).—I cannot but be gratified with the cordial reception of my paper. I thank the Fellows for their indulgence and criticism. The first criticism of an adverse character to which I desire to reply is one which struck me with particular force. That was that, in my fatal case, in which, if the patient did not have peritonitis at the time of the operation, she at least speedily developed it, I gave opium instead of salines. I may say that in all my cases of abdominal surgery it is my practice to abstain from opium, and upon the first rise of temperature to give salines. In this case the attending physician gave an opiate, but only in response to the appeals of the patient; and as soon as the tympanites began I gave her calomel, as her stomach would not retain salines. It should be remembered that, in this case, the placenta had been in the abdominal cavity at least five hours before the operation, and that, as a consequence, inflammatory and, may be, septic conditions had already become established.

The next criticism was that by Dr. Vander Veer, to the effect that the margins of the rent should have been pared, to remove all necrotic tissue. I concede the correctness of the surgical principle involved in the criticism; and, so far as I could, I carried it out; but, quite unfortunately, the location of the rent was such I could not trim up the edges completely. The injury involved so many structures—the muscular wall of the uterus, the peritoneal covering of the uterus, the serous wall of the bladder, and the upper segment of the vagina—that careful trimming of the margins was manifestly impracticable.

Dr. Wathen has called attention to these cases of low-down posterior rupture as the ones best calculated to recover without operation; and calls attention to the ease and facility with which drainage from the abdominal cavity can be effected in this class of cases by virtue of the location of the injury. My conception of this class of cases, and of the treatment required, is somewhat difficult. The patient, lying upon her back, will drain the uterus into the abdominal cavity rather than the abdominal cavity into the uterus and vagina. It is but fair to add that this is but a theoretical conclusion, but it seems to me that the

cul-de-sac, in these cases, occupies a position below the upper margin of the peritoneum.

Dr. Wathen.—With the permission of Dr. Reed, I wish to allude to the position of the patient favoring gravitation of the fluid into the abdominal cavity. I claim that it is a physical impossibility for the fluid to ascend, with the patient on her back. You may give the statistics of Martin as evidence that it does go upward. That is not evidence in these cases. I wish to refer you to those cases where there is no obstruction to the outward flow, and there is no instance upon record where drainage has not passed out. In vaginal hysterectomy, where the wound is closed and the drainage-tube introduced, we have had trouble; but where it has been left open so that the discharge would freely pass away, there has been no trouble. The same obtains in these cases.

Dr. Reed (in reply to Dr. Wathen).—Martin, in the employment of vaginal drainage, had fourteen deaths in seventy-seven sections.

TWO CASES OF INTRA-UTERINE AMPUTATION OF THE FOREARM.

By JOSEPH PRICE, M.D.,
PHILADELPHIA.

Medical literature is full of reported cases of this kind, and I record these merely to add to the data for research:

Case I.—A patient at the Preston Retreat—O. N., German, age twenty-two; first pregnancy; no history of specific disease; course of gestation normal—was delivered of a female child after a labor of nine and a half hours. Presentation was a first vertex, and the labor normal. Child was in good condition, weighed 6 lb. 10 oz., with the following diameters of head: Occip.-ment. 5, 5; occip.-front. 4, 5; occip.-bregmatic 4; bi-parietal 3, 5.

The cord was very thick, and was wrapped one and a half times around the neck. The left forearm was amputated one and a half to two inches below the elbow-joint. The stump was conical, and perfectly healed. The remnants of both bones of the forearm were normal, and the elbow-joint was perfect. There was a deep depression in the left temporal and parietal bones, with a nearly healed, granulating ulcer.

The stump presented approximating the depression in the skull, and had to be pushed back to enable the passage of the head. The child thrived, and beyond one or two slight convulsive movements—hardly definite enough to be called convulsions, and noticed only on the first and second days—was perfectly normal during its mother's convalescence in the institution.

This infant was examined by Prof. Parvin and others, and all agreed that intra-uterine cord amputation was the only explanation of the fact. Careful search among the secundines and of the cavity of the uterus failed to discover the missing member or any trace of it.

Case II. (Reported by Dr. E. W. Watson).—M——; sex, female. Date of birth, May 1, 1881, Condition: large, well nourished; left forearm amputated in utero at upper third; good conical stump. The cord, which was large and thick but short, had one knot in it.

DISCUSSION.

Dr. A. Vander Veer, of Albany, N. Y.—I think the point of great interest is the pathology in these cases. Probably there are two classes; one class in which, beyond doubt, something occurs in the course of fetal development and there is an arrest of growth of the limb. There is another class of cases, undoubtedly, in which the cord encircles the limb, either in the form of a knot or in some such manner, while development is going on, and the result is a complete, clean amputation of all the tissues. There is now living in Albany a young man, twenty-three years old, whose case attracted considerable attention at the time of his birth. I here present a stereoscopic view taken at the time by the family physician, now deceased. The name of the young man's father is on the back of the card. The case was looked upon at the time as one of arrested development. At a meeting of the State Medical Society it was discussed at length. The stump has the appearance of a clean amputation, the left arm and upper portion of the right arm are well developed, and his general condition of health is excellent in every respect.

The following is a complete history of the case:

A. T., a soldier of the 186th Regiment, New York Infantry, while engaged in the battle of Petersburg, the 2d day of April, 1865, was wounded in the outer upper third of the right arm; was taken to the hospital, where he remained two months; was discharged, and came to his home, Albany, N. Y., about the 7th of June; wounds in an ulcerated state; went under treatment, and they became healed in about two months. This child (male) was born the 5th day of June, 1866—about one year after his discharge, and ten months after perfect recovery from the effects of the wound. There was no development in the child of the right arm, from about the point corresponding with the wound received by his father. The bone can be felt slightly covered by skin; no rudimentary fingers can be made out, and it has the appearance of a complete amputation. The young man is now employed as a telegraph operator, and performs his work with dispatch and success. The stereoscopic view I present shows very well the appearance when the boy was about three years old.

I may mention another case: A young successful business man, aged twenty-seven; the forearm was amputated at the middle third, the arm perfectly developed above.

A third case: We have a specimen in the museum; a child born with the cord about the lower third of the thigh. It would be called really

an amputation, except as to the vessels and the bone. The vessels were held tight to the bone and nourishment carried to the knee below. No development, however, occurred to the knee or leg below, and finally amputation was made. Patient made a good recovery and the specimen is quite rare in its way. The cord was simply tied about the thigh at the point of constriction.

Dr. J. H. Carstens, of Detroit, Mich.—I incline to Dr. Vander Veer's opinion in this matter. It does not seem to me that the cord tied around an extremity would sever it so completely that nothing would remain. If a case is presented where the extremities are found I will admit it. I will concede that the cord might produce a certain amount of constriction, but to tie it so tight as to cut through all the tissues, bones and all, does not seem to me probable. I was called upon to deliver a woman who said she was born without a hand, and claimed it was due to a maternal impression. There is no doubt at all that there is something in maternal impressions which we do not understand at present, though not so much as the public generally believes.

Dr. Wathen.—Do I understand you to say that in all these cases it is due to arrested development?

Dr. Carstens.—Yes, sir.

Dr. Wathen.—How, then, do you account for those cases where amputated limbs have been found in the uterus?

Dr. Carstens.—I believe the most generally accepted theory is, that it results from amniotic bands, where the amniotic liquor is deficient.

Dr. Price (closing the discussion).—In this particular case the child was examined by a number of prominent men like Parvin, Parish, and others, and they all agreed there was no other solution in the presence of facts connected with this case.

We cannot throw out maternal impressions wholly. I remember a case of a woman badly burned: the hospital surgeon directed that if the woman died undelivered to perform Cesarean section. In the course of a few hours, while she was in collapse she was delivered, and the surfaces of the child, corresponding exactly with the burned surfaces of the mother, were blistered,—*exactly the same surfaces.* We may call this maternal impression, or some other influence. It strikes me it was not altogether a maternal impression. There is surely some other influence. We can not explain it wholly by maternal impression.

Dr. Carstens.—I would like to ask Dr. Price if he would not think that, the arm being over the head, the pressure of the head on

the arm, between the head and the uterus, would not account for the amputation?

Dr. Price.—Cord fixation would be the only permanent fixation. The active movements of the fetus in utero are too great to allow fixation from other causes. You remember the case of Schroeder, in which he turned during five consecutive days, and in which the condition returned each time.

RECTIFICATION OF FACE PRESENTATIONS.

By ROLLIN L. BANTA, M.D.,
BUFFALO, N. Y.

"Because of the uncertainties of the prognosis in face presentations, many manœuvres have been proposed for the conversion of the latter into normal presentations. Though occasionally successful, they have been discountenanced by most obstetric writers, because experience has shown the results to be by no means commensurate with the dangers incurred."

This quotation, taken from one of our latest obstetrical writers, seems to be, as far as my observation goes, the sentiment of most of the eminent obstetricians of the present day. All agree that face births are abnormal births, and although this form of labor may be a very simple one, as a rule, it is attended with more danger to the mother and is manifoldly more dangerous to the child. Also, it seems to be almost the unanimous opinion that the various methods proposed by such men as Meigs, Baudelocque, Hodge, and lately by Shatz, either on account of the difficulties or the dangers which occur in putting them into practice, have not succeeded in fulfilling the hopes entertained by their originators; and, all things being considered, it is better to trust to nature than to any manipulation, although, in a great many cases, nature makes pretty bad work of it, and often is utterly unable to accomplish her object without the aid of art. My own experience is so at variance with these teachings that it is to be hoped it will not seem presumptuous in my claiming that face presentations can be rectified by internal manipulation; and that an abnormal and tedious labor can be easily and safely changed into a normal and simple one, thereby saving much suffering to the mother, and danger to the child.

If, at times, a beaten path is gone over in the plan presented in this paper, it is hoped enough of the new is added, and the whole

so simplified and methodized, that a claim can be made of touching, at least, the boundary line of originality.

For convenience of description, and for the reason that the writer has found it to answer his purpose so admirably—and, moreover, because it is believed to be right—a brief sketch of the anatomy of the female pelvis, as taught by Dr. Henry Landis, is here given.

If the sacral and iliac wings of the female pelvis be removed, the inlet presents an appearance as shown in Fig. 1. For all practical

Fig. 1.[1]

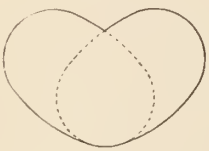
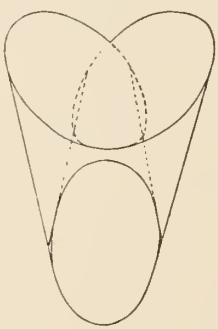


Fig. 2.

purposes, the outlet has a shape as shown in Fig. 2. If these two figures be combined, and lines drawn to indicate the pelvic walls, we have an outline as shown in Fig. 3. If, now, a cardboard be cut out having the shape of a section of the middle circumference

Fig. 3.



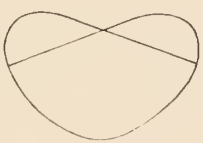
of the flexed head, it has the shape of an ellipse, as shown in Fig. 2, which also represents the outlet. If the card is now applied to the inlet, it is found that it completely coincides with it on one side, and, if reversed, on the other side, the two outlines intersect each other.

[1] Diagrams 1, 2, and 3 are taken from "How to use the Forceps," by Dr. Henry Landis.

It, therefore, requires but a slight stretch of the imagination to see that the inlet, instead of being an irregular oval, as is generally described, is indeed "beautifully regular in outline, and that the pelvis contains two canals, each of the same outline or calibre as the fetal head, and a little larger. These canals are partly divergent above, and entirely identical at the outlet," as shown in the theoretical diagram (Fig. 3). The one containing the right oblique diameter is called the right canal; the opposite one the left canal. The head, in labor, passes into one of these canals, and, as it descends into the pelvis, it is, of course, followed by the shoulders, also having an elliptical outline, which enter the other canal. Before the shoulders descend very far the head is born, showing there is need of one canal only at the outlet.

One more glance at the pelvis, in order to call attention to certain spaces bounded in front by imaginary lines drawn from the base of each sacro-iliac arch, as shown in Fig. 4. These lines may be

Fig. 4.



called the sacro-cotyloid diameters, and the spaces posterior to them, for want of a better name, the sacro-cotyloid spaces. They are situated at the posterior part of the right and left oblique diameters, or, in other words, at the posterior part of the right and left canals. At the inlet they are quite conspicuous, and become smaller as the canals merge into one; so that a body occupying one of the canals, there is necessarily left at the posterior part of the other a free space, which disappears as the body descends into the pelvis. Special attention is called to this space, as it has an important bearing on what follows.

Face births are divided into anterior and posterior presentations. When the chin presents anteriorly, if the pelvis is large, the head small, or the neck long, there is usually no difficulty in delivery; but, if otherwise (and how any one can tell the size of the head or neck before delivery has never been in my power to discover), then the birth becomes a more serious matter. A body having a

diameter of about seven inches must be forced through a tube, the longest diameter of which is a little over four inches. The characteristic appearance of the child's head after a face birth shows the great amount of moulding which must take place before delivery is accomplished. If, then, a certain number of anterior face presentations are so serious in their nature, any procedure which will safely rectify and make them normal will certainly be a boon to the mother, saying nothing of the avoidance of the dangers which threaten the child. Such a procedure it is now my intention to describe, and it has been put to a test often enough to leave, in my opinion, no doubt of its efficacy.

It is not questioned for a moment that quite a proportion of face births are easy births; but to tell just what ones with which to interfere, is a question extremely difficult to decide; therefore, would it not always be better to rectify them as early as possible, especially as there is not the slightest doubt that those cases which nature can take care of are easily managed, while those of a more serious character must often depend upon artificial aid?

Before proceeding further, it will be well to state that the application of the method under consideration necessitates that the head is movable and not impacted in the pelvic cavity, and that the cervix is dilated or sufficiently dilatable for the introduction of the hand into the uterus.

In the first face presentation, L. M. A., the face is in the right canal, and the trachelo-bregmatic diameter of the face corresponds to the long diameter of the right canal or to the right oblique diameter of the inlet (German nomenclature). Even at the inlet, the face entirely fills this canal. As the head descends, the anterior posterior diameter of the neck, about three inches, is added to the depth of the cranium or to the suboccipito-bregmatic diameter of the head, about four inches in length. Now begins the process of a body, having a diameter of seven inches, being forced through a passage of about four inches, which, if left to nature, is accomplished by a great amount of force and moulding of the parts, and only then when certain favorable conditions, before mentioned, are present. A glance at the other canal shows that it is occupied by the bimalar or transverse plane of the face, but, on account of the smaller size of this diameter or plane, measuring a little over three inches across, there is left at the posterior part of this canal, a free

space—the left sacro-cotyloid space. It would seem, on first thought, if there were any internal manipulations to be made, above the brim, it would be best to pass the right hand through this unoccupied space; but to reach the posterior part of the head, which will be seen in a moment is one of the main objects to be attained, it would be necessary to pass the hand from one side of the pelvis to the other, over or under the shoulders or body of the child, which, for any practical purposes, would be impossible.

In order, then, to manipulate the occiput or extended head which occupies the right sacro-cotyloid space, the left hand is passed into the vagina and uterus (if need be) on the right side of the pelvis well back until it is stopped by the forehead or vertex. By now placing the fingers around the vertex, or, for that matter, any part that can conveniently be grasped, only remembering that the hand is on the right side and to the posterior, enough force can be used, and only the slightest amount of force is required, to rotate the head anteriorly about a quarter of a circle, when the chin will look posteriorly and the face will be in the left canal. At the same time, and, perhaps, just before the attempt is made to rotate, the head is pushed up sufficiently so that the chin will be well above the brim. This is a very important point to remember if the head is large or the pelvis small, and even if that is not the case, it may save considerable trouble in the after-manipulations. The face is now in the L. M. P. position, which is considered one of the most difficult for delivery. There is also at the posterior part of the right canal a free space, the right sacro-cotyloid space, through which the hand is passed and placed well over the occiput. The next step is to bring about flexion, which is not always easily accomplished on account of the cramped position of the internal hand.

Every obstetrician is well aware of the fact that occasionally it is almost impossible to keep the hand within the contracting uterus for any length of time, and if there is work to do, it must be done quickly, or the hand withdrawn for a rest. This difficulty can usually be overcome by placing the free, or right, hand over the abdomen of the mother and over the left internal hand, when flexion, or, for that matter, extension, can be made at will. After flexion the presentation is R. O. A., or the old second position.

The right hand is an important factor in this manœuvre, for it not only aids the left hand in flexing the head, but it also helps to push it well down into the pelvic cavity. If flexion does not readily occur, it is because the chin has not been forced high enough above the brim and it is stopped at some point of the pelvic walls. If there is any fear that extension will again take place, and that is liable to happen only when there has been a failure to force the flexed head well down into the pelvis, either the hands should be kept in place for a few pains, or the forceps applied and enough traction made to prevent that danger. A knowledge of the manner of proceeding in the position just described—the first face position—is the key to the other three, consequently only a few remarks need be made concerning each of them.

In the R. M. A. position the face is in the left canal, and now, for the same reason, the right hand is used instead of the left. The occiput is brought to the front in the same manner, and having passed the hand through the left sacro-cotyloid space, the head, with the aid of the left or free hand, is flexed and pushed down into the pelvis, which changes the position into the L. O. A., or old first position.

In mento-anterior positions when the child's back looks posteriorly, forced anterior rotation of the head may twist the child's neck disagreeably and perhaps dangerously; but in the cases which have come under my observation, rotation of the body has always accompanied rotation of the head. The judgment of the past and present is adverse to any interference with anterior face presentations, but the certainty that experience gives one of doing a thing safely and well has robbed for me that variety of births of any anxiety when called to attend them. With our knowledge of modern antiseptics, the introduction of a clean hand into the uterus, through a clean vulva and vagina, is entirely devoid of danger so far as carrying any septic material is concerned. Adding to this a certain amount of skill, which every practitioner is supposed to possess, there is scarcely any doubt of the successful application of the rules just described.

Regarding mento-posterior presentations, my method of rectification is so similar to that described by others, that if it was not for some change in the technique of the manipulations it would hardly be worthy of repetition. Sometimes a few slight additions to an

operation will make easy what was before difficult. At any rate, four posterior presentations, one of them a brow, which may be considered a variety of face birth, have been rectified by the following plan, with the happiest results, only one causing any considerable trouble:

Nature's method of delivery, when the chin looks to the posterior, is anterior rotation, and if that does not take place, Nature is unable to finish her task, unless under very unusual circumstances; because the "forehead remains stationary at the front part of the brim, while the base of the skull and the upper part of the chest attempt to advance under the sacro-iliac arch, which is impracticable." It is for this reason that it has been proposed lately to bring about anterior rotation by manual interference and the subsequent application of the forceps, which is, indeed, a very good plan if it was not possible to substitute a better one. In the R. M. P. position, the face being in the right canal, all that is necessary to do is to produce flexion, keeping the long diameter of the face and head always in the same canal. In fact, it is a repetition of the same steps as in the L. M. A. position after rotation has been effected. In the same way the right hand is passed into the right sacro-cotyloid space, and with the aid of the left hand the head is flexed and pushed down into the pelvic cavity, and into the R. O. A. position. It is well not to forget that one of the principal points essential to the success of the manœuvre, before an attempt has been made to bring about flexion, is to see that the chin is forced well above the brim. In the L. M. P. position, as the face is in the left canal the left hand is used instead of the right, and the remaining steps are exactly the same as those just described.

Like almost every other obstetrical operation where it is necessary to make internal manipulations, it is best to bring the patient to the edge of the bed as in the forceps position. In the majority of cases it will be found impossible to do anything without administering an anesthetic, although in three of the five anterior mento presentations under my care it was not employed, and the whole manœuvre was performed in considerable less time than it took to explain the trouble and get the consent of the patient.

DISCUSSION.

Dr. J. H. Carstens, of Detroit, Mich.—I supposed from the title of this paper that Dr. Banta was going to steal all my thunder, and I see he has actually accomplished it. He has expressed the very views I have held on the subject for some time. The only improvement I would suggest is to put the woman in the elbow position, or at least an exaggerated Sims's position. In that way turning can be accomplished easier than any other. I nearly always give such patients chloroform, withdrawing it as soon as they are well under its influence. Sometimes, where it is difficult to retain the head in its changed position, I have immediately applied the forceps as the doctor suggests, and delivered them. I perfectly agree with Dr. Banta in the stand he has taken, and I think it is high time the general practitioner appreciated this proceeding. I can report some seven or eight cases, perhaps more, and in each of these the child was saved. That is more than I can say in cases where they were left to Nature.

Dr. W. W. Seymour, of Troy, N. Y.—It has been my fortune to have in my practice several face cases. And among the earlier ones in which I called upon my father for assistance, having quite a dread of the condition, he advised version by the head, and in some of the cases I have labored to bring about a change of the presentation to the occipito-anterior position, in the way Hodge and others advised, introducing the left hand in the left side of the pelvis, the fingers over the occiput and thumb against the brow, then as pains came on producing flexion of the head. If the occiput had well entered the pelvis, instead of attempting to produce change of the presentation from face to occiput, I should prefer, if I could, to produce flexion by the vectis. I have used it in some instances. In the cases in which I have employed it to produce flexion I have liked it even better than version by the head. Another thing to be mentioned is the reason for the anterior rotation of the head when the chin is posterior; when the chin comes down in the pelvis anterior to the spine of the ischium, we will always have anterior rotation. Under these circumstances I can see no grave objection to what Dr. Richardson, of Boston, has done and my father has long since advised in similar circumstances—the application of the forceps with the curves reversed, thus producing rotation so as to bring the chin anterior to the spine of the ischium, to be followed by a reapplication of the forceps. In the cases I have had of anterior position of the chin I have always succeeded by attempting not to bring down the occiput, but by bringing down the chin. While it has

possibly increased the danger to the child, it has almost invariably resulted favorably. I cannot recall a case of loss of the child, and in most cases there has been easy labor. The last case was several days since, in which I mistook at first the anterior for the posterior fontanelle. I passed my fingers over the chin, brought it down in the intervals, and the patient was delivered speedily, safely, and without injury to herself or the child.

Dr. Banta (closing the discussion).—The criticisms I have no objections to. If a man prefers to wait and trust to Nature in these cases it is well he should do so. But if we can, by a simple and efficient method, rectify them, I think it is better and safer for the mother and child. In regard to Dr. Carstens's remark about posture, I think he can do all that is necessary by the use of an anesthetic. It is hard to keep a patient in the knee-chest position while under an anesthetic. You will certainly require a number of assistants to do so, and, moreover, I think it is unnecessary.

Regarding the use of the vectis as an aid in rectifying face presentations, I can only say that I could never make it work on the manikin, to say nothing of the living subject.

Hodge, in his work, describes a method of rectifying posterior face presentations, but does not recommend any interference in the anterior variety; and it is just these cases, the antero-mento presentations, which occasionally need considerable assistance, and which can be given by the plan recommended in my paper.

FLAP-SPLITTING IN PERINEORRHAPHY, WITH SPECIAL REFERENCE TO TAIT'S OPERATION.

By X. O. WERDER, M.D.,
PITTSBURG, PA.

The perineum has always been a very fertile field for the surgeon. Numerous operations have been devised for restoring this structure to its normal anatomical condition. Nearly all of these operations have had this in common, that they started out by removing the old cicatricial tissue, and very often also healthy tissue, causing really a new defect for the purpose of covering an old one. With the progress of plastic surgery, by the formation of flaps in other regions of the body, surgeons commenced to transfer this method of operating to the perineum. Dieffenbach, I think, was the first to suggest the covering of the defect by flaps. He says:

"In those cases where there is a considerable loss of substance, the transplantation of an adjoining piece of integument may be resorted to—*i. e.*, a plastic operation may be attempted." (Marcy: *The Perineum.*)

To Langenbeck, however, belongs the credit of having originated and practised splitting the recto-vaginal septum, forming two flaps —one anterior and one posterior—and utilizing them for the purpose of making a new perineum. This method is described by Verhaeghe and Biefel (Hegar and Kaltenbach: *Cyclopædia of Obstetrics and Gynecology*) as follows:

"Langenbeck's Perineosynthesis.—Two fingers of the left hand in the rectum stretch the parts transversely, and a narrow strip of the entire thickness of the vaginal wall is then removed with curved scissors. A flap, rounded below, is cut in the posterior vaginal wall and dissected, in an upward direction, from its base, the recto-vaginal septum being thus divided into two lamellæ. The posterior lamella remains *in situ* and serves to close the rectum; the anterior lamella is drawn forward and united to the anterior portion of the new perineum, where it is to form a surface running obliquely downward. A quadrilateral space is described upon the inner surface of each lip by means of a scalpel, and is freshened by dissecting a layer of tissue about a line in thickness. Anteriorly, the incision begins where the posterior commissure of the vagina ought to be; posteriorly, it passes into the denuded

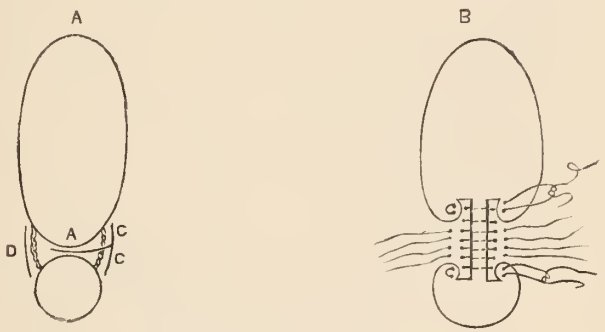
septum on both sides. The entire denuded surface is about one and one-half inches long by three-fourths of an inch wide.

"The sutures toward the rectum are first introduced, then the flaps of the vaginal wall on both sides are united to the anterior part of the new perineum by two or three sutures. Finally, the fissure in the perineum is united from before backward."

Though this operation is now obsolete, it being complicated, somewhat difficult to understand from a mere description, and probably not as successful in its results as the modern ones, it was certainly a great advance over the methods of operating at that time—about forty years ago. It certainly does great credit to its originator, as the principle of it was correct and is now underlying all the flap operations of the present day.

The modification of Langenbeck's perineosynthesis by Wilms, Bischoff, and Staude, do not materially differ from the old operation, except that they are simpler in their technique and based on more scientific principles; but as they are, like Langenbeck's, not pure flap operations, I will not go into their details.

FIG. 1.



Method of Voss, taken from Sänger.

VOSS'S METHOD.—To Voss, of Christiania, belongs the credit, according to Sänger, of having first devised and performed a pure flap operation—that is, an operation in which no tissue is removed, but in which the defect is closed by the formation of flaps. He performed his first perineorrhaphy in 1865, and described his method, illustrating it by two plain but good diagrams in the *Transactions of the Medical Society of Christiania* of the year 1870. (Sänger: *Centralblatt für Gynäkologie*, No. 47, 1888.)

In complete lacerations, he separates the rectum and vagina to a depth of about one-fourth of an inch (Fig. 1, *a*), then a semi-

circular incision is made on each side of the septum recto-vaginale between skin and cicatricial tissue (*b*, *cc*). A straight knife is now introduced and carried beneath the whole cicatrix until its point appears at the first incision (*a*), then cutting through the whole septum until you have two distinct flaps—anterior and posterior—the anterior flap forming the vagina, and the posterior the rectum. The vaginal flaps are sutured from above, the rectal flaps from the rectal surface, and the intermediate raw surface is united by perineal sutures, as seen in the diagram.

This method, which is really the prototype of all the modern flap operations, does not seem to have been very successful; for, of the four cases reported by Voss himself and his follower Nicolaysen, two of them were succeeded by recto-vaginal fistula.

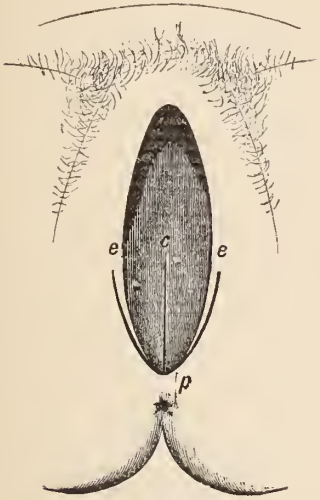
Much simpler in technique and followed by better results is that of Simpson, of Edinburgh, the first record of which is found in Hart and Barbour's work on gynecology, first edition, published in 1882. The authors give to John Duncan, of Edinburgh, the credit of originating it.

Simpson's Method.—In incomplete ruptures an incision is made in the median line of the columna rugarum at the point *c* (Fig. 2), and carried down to the ruptured perineum, *p*; then two lateral incisions are made, starting at the point *p*, to the inner surface of the labium minus on each side (Fig. 2, *ee*). The two triangular flaps thus formed are now dissected free and turned up (Fig. 3), so that the points (*p*) will form the new commissure of the vagina; they are then united by silk or wire sutures, which are tied on the vaginal surface of the flaps. Two or three perineal sutures are then passed to close the cavity left between vagina and rectum. (See Fig. 3.)

In complete ruptures the recto-vaginal septum is divided by an incision at the point *S* (Fig. 4), carrying it outward to the point 1; then another incision is made from the point *a*, at the lower edge of the labium minus, parallel to the labium majus, meeting the other incision at the point 1, and continuing it to *p*, at the end of the torn sphincters. The same is repeated on the other side. After dissecting off the flaps thus outlined by the three incisions, we have formed four different flaps—two vaginal (Fig. 4, *a* 1 *S* and *a* 1 *S*), and two rectal (Fig. 4, *S* 2 *p* and *S* 2 *p*). The vaginal flaps are turned up toward the vagina so that points 1 1 meet and form the posterior commissure of the new vagina, as in Fig. 5, and united, as in the previous operation, by silk or wire sutures knotted on the vaginal

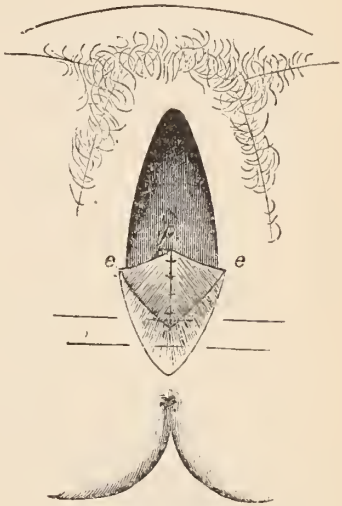
surface of the flaps, and the sutures are left long so as to protrude from the vagina. The rectal flaps are now turned back into the rectum so that points 2 2 meet, as in Fig. 5, and united the same

Fig. 2.



Simpson's method.
Incomplete rupture of perineum.

Fig. 3.



Simpson's method.
Incomplete rupture of perineum.

(Taken from Hart and Barbour.)

Fig. 4.

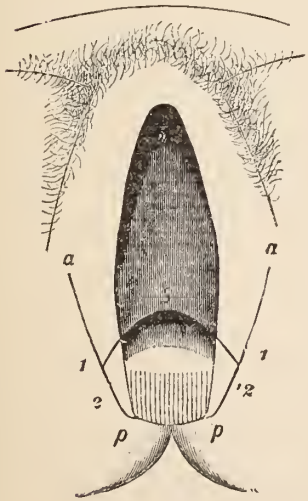
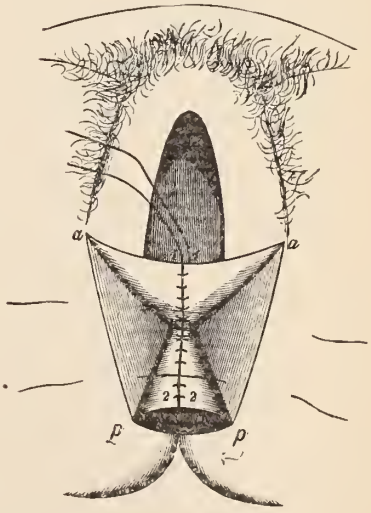


Fig. 5.



Operation for complete lacerations of the perineum.

way as the vaginal flaps, knotting the sutures in the rectum, but choosing catgut preferably for suturing material. The sutures are cut short. We have now finished the repair of vagina and rectum; it remains, however, to close the raw, open surface between rectum and vagina by deep external silver-wire sutures, as in the incomplete operation above described. The perineal sutures are not knotted, but tightened by button plates. The edges of the skin are united by a few superficial sutures.

This operation is not only very popular in some parts of England, but has found advocates among some of the most prominent gynecologists of the Continent, especially in Germany, by whom it is preferred to all other operations, and particularly so for cases of prolapsus uteri, as it is said to form a very firm recto-vaginal septum. In ten out of eleven cases of complete procidentia reported by Sonntag,[1] he obtained excellent results; in the eleventh case a small portion of the perineum healed by granulation. Zweifel and Hegar also recommend this operation for prolapse cases.

In 1887, H. Fritsch described, in the *Centralblatt für Gynäkologie*, vol. ii. page 473, a method of operation for complete ruptures of the perineum, which has given him excellent results and which presents many advantages over other operations.

Fritsch's Operation.—After separating the rectum from the vagina, by an incision through the recto-vaginal septum about one and five-tenths centimetres deep, until both organs are freely movable independently of each other, he frees the stumps of the sphincter ani muscle on both sides, and then, passing a ligature through each one temporarily, he pulls them down, restoring thereby the natural condition of the rectum. The everted rectal mucous membrane is by this means generally turned into the lumen of the bowel, so that the freshened surfaces of the flaps come in contact with each other. When the vaginal flaps are also drawn up we notice two distinct rents in the flaps, the upper, or vaginal, being considerably longer than the lower, or rectal. The rectum is closed by interrupted catgut sutures which are inserted from above—*i. e.*, on its vaginal surface, care being taken not to puncture the rectal mucous membrane. The knots become buried in the wound; this is done in order to prevent the passing of fecal matter or flatus into the wound. When the ends of the sphincter muscles, through

[1] Sonntag, in Verhandlungen des III. Congresses der Deutschen Gesellschaft für Gynäkologie im Freiburg, June, 1889; Centralblatt für Gynäkologie, page 500.

which the temporary silk ligatures have been passed, are reached, the ligature is removed and replaced by a catgut suture. The vaginal flaps are also united by catgut sutures. The remaining perineal wound is closed by two or three deep sutures introduced from the perineal surface, as in Simpson's operation.

The principal difference between the last two operations is that, in the latter, the cutting is strictly confined to the recto-vaginal septum, it only requiring one incision, which is more or less transverse, and that the rectal sutures are passed from the vaginal side of the rectal flaps. Of the two, Fritsch's operation is, therefore, the simplest in technique, and its results seem to be all that can be desired.

Marcy's Operation.—The operation devised by one of our Fellows, Dr. Marcy, which he first described at the meeting of the American Medical Association in 1883, is also based on the principle of flap-splitting.

"The sphincter having been stretched and the bowel thoroughly emptied, two fingers in the rectum, the posterior third of the vagina is separated, with knife or scissors, from its vulvar attachments. The recto-vaginal space is easily found, without much loss of blood, and the dissection of the vagina from the rectum is carried into the lateral sulci as far as may be judged sufficient. The separated flap is lifted and held by an assistant; then I introduce a large curved needle, the eye near the point, armed with tendon, deeply from side to side; the opposite end is threaded, and the needle withdrawn, carrying the tendon with it. The suturing is continued in this way, until the required number of stitches are taken. . . . Usually, four or five stitches are required to unite the posterior vaginal fascia, and then the separated ends of the perineal muscles are included in the deep sutures. Any other needle and stitch may be used, but I prefer the one above mentioned.

"If the ends of the retracted perineal muscles seem tense when united, I use the lateral supports, applying one or two pins, as heretofore described. These serve simply to retain at rest the coapted parts, and lie parallel to the anus outside the sutures. If the operation is aseptic, the after-treatment is simply rest in bed, and the cure complete."

The peculiarity of Marcy's operation, therefore, as not so much his method of preparing the flap, it is his method of suturing, which is by buried catgut or kangaroo tendon, supported externally at the perineum by his double pins, when found necessary. It is a method equally simple and successful, because based on sound anatomical principles. For a further description of the operation, I refer to Dr. Marcy's excellent paper on "The Perineum," read before

the Association of Obstetricians and Gynecologists at its first annual meeting.[1]

The operations of Voss, Simpson, and Fritsch, and, to some extent, also that of Marcy, all have this in common, viz., that the sutures are introduced from three different sides for the closure of the raw surface made—namely, from vagina, rectum, and perineum —and in this they do not differ from the old triangular operation. This, however, is much simplified by Tait's new perineal operation first described by Sänger in Volkmann's *Sammlung klinischer Vorträge*, 1887. (Ueber Perineorrhaphie durch Spaltung des Septum Recto-vaginale und Lappenbildung) In this operation only one kind of sutures is employed—namely, perineal sutures—both in incomplete as well as in complete lacerations. Lawson Tait first described his method of perineorrhaphy by flap-splitting in the *Transactions of the Obstetrical Society of London*, vol. xx. page 291, 1879. Since then he has repeatedly modified his operation, so that his newest method hardly resembles the one first described by him. According to Meinert,[2] there are no less than four different modifications of the operation made by himself. They are, however, all based on the one principle—namely, to restore the perineum to its former anatomical relations by splitting the old cicatrix, but without removing any tissue. The older operations have been known and practised in this country for some time, but the new and latest operation seems comparatively unknown—at least the only references I could find to it are in the *American System of Gynecology*, by Howard A. Kelly, and by Hadra, in his book, *Lesions of the Vagina and Pelvic Floor*, and they both took their descriptions from Sänger's pamphlet. Paul F. Mundé is the first American to describe the operation minutely, and based on his personal experience of seventeen cases, in the *American Journal of Obstetrics*, July, 1889, illustrating it by excellent woodcuts and plates. In Europe, especially in Germany, this new method has attracted considerable attention since Sänger's publication and has found many advocates among the best authorities, as Zweifel, Martin, and Winiwarter. Induced by these publications and the high recommendation it received from such reliable sources, I tried it for the first time about eight months ago, the case being a complete rupture of

[1] See Transactions of the American Association of Obstetricians and Gynecologists, vol. i. page 69, 1888.

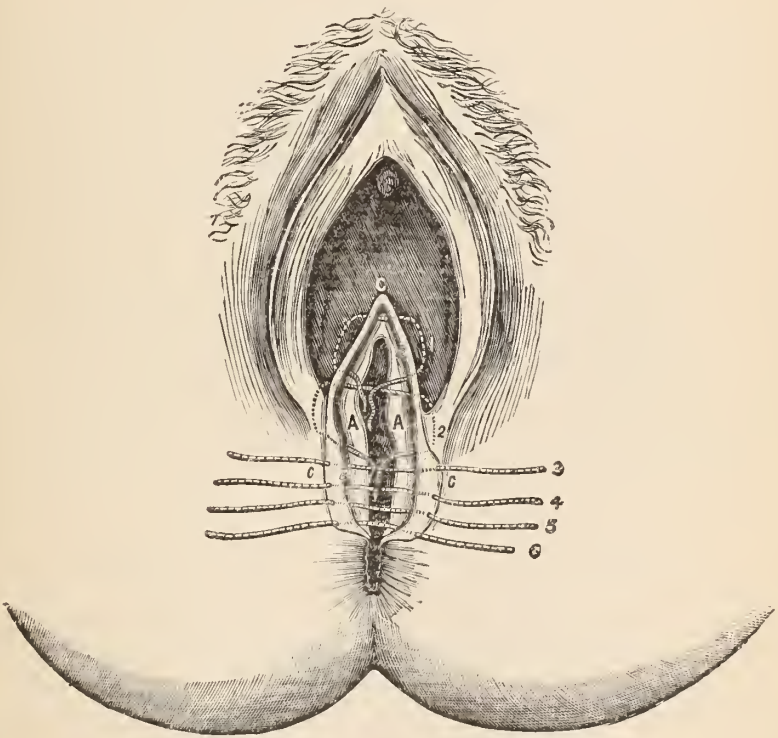
[2] Centralblatt für Gynäkologie, vol. xii. page 649.

the perineum. The result was so highly satisfactory that I have since operated on every case presenting itself to me by Tait's new method.

The old method of Tait is described as follows, by Edis in his work on *Diseases of Women*, page 445:

"Tait's Old Method.—He (Lawson Tait) employs sharp-pointed scissors, running the point of the lower blade through the skin and mucous membrane (along the line *cccc*), to such a depth as will enable the operator to turn a flap backward from each edge of the rent into the rectum. In making this incision, it is important not to cut at right angles to the vaginal

Fig. 6.



Tait's old method. Complete laceration of perineum.

surface, but at a somewhat acute angle to it, so as to bevel the flap outward. The depth of the incision must also be so regulated as not to risk the life of the flap. When the raw surfaces are adjusted and fastened together, it will be seen that these everted flaps form a valve, uninterrupted by stitches, which closes from the rectum, and must, therefore, greatly aid the healing of

the wound by preventing the admission of feces. To this peculiarity he attributes very largely the uniform success he has with this operation in a large number of cases. He uses no special needle: either a long-handled curved one, or a common curved needle in a needle-holder, threaded with some of Pearsall's pure silk, which he prefers to wire or silkworm gut. The upper stitch (1, Fig. 6) is first introduced. The needle may be passed from either side into the septum, about an inch from the apex of the rent, and its entrance and exit should always be just at the line of reflexion of the flap (*b b*). It is passed in the thickness of the septum and brought out within a quarter of an inch of the apex of the rent, entered again and passed similarly in the thickness of the septum and out again opposite its vaginal entry. If properly passed it should not, when tightened, be seen or felt either in the vagina or rectum, but should pass between the two mucous surfaces through its whole extent.

"The stitches are not to be tightened, however, until they have all been placed. If necessary, on account of the extent of the cut, a second, similar to the first, should be placed lower down (2). As a rule, one row with the perineal stitches will be enough; indeed, in very many cases the perineal stitches will do all that is required, and septal stitches are needed for bad cases only. The perineal stitches should never be less than three in number, and should usually be four. The third (5 in Fig. 6) should be introduced just within the line of the incision on a plane with the septum and its stitches, if there be any.

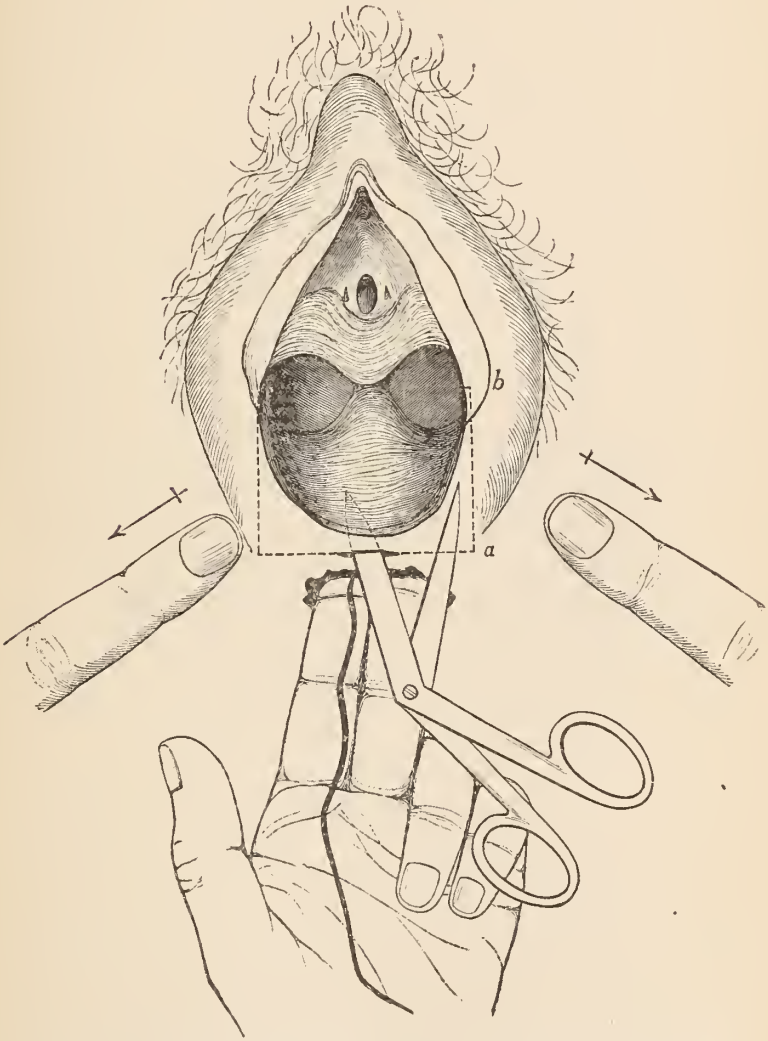
"All bleeding having been stopped and the wound thoroughly cleansed, the septal stitches are to be first secured, care being taken that the flaps are turned well into the rectum, and not caught in the tightened stitch —this being really the most important part of the operation. The middle perineal stitch is then to be secured and then the posterior, the same precaution with the flaps being taken. The anterior stitches are then to be secured and the ends of all cut off, leaving about half an inch of thread. If the two edges of the incision do not lie quite close together, two or three superficial stitches had better be placed to bring them close.

That there is considerable difference between the operation just described and the new method of perineorrhaphy introduced to the public by Sänger, anybody can readily see by comparing the accompanying woodcuts. The difference consists not only in the formation of flaps, but particularly in the introduction of sutures. In the above operation the septum is stitched separately; in the new operation this is discarded entirely, all the stitches introduced being perineal. The new operation is, therefore, undoubtedly an improvement over the old one, not only in its remarkable simplicity of technique, but also in its results.

The patient to be operated on is prepared in the usual way, by the administration of laxatives for several days previous to operation

and an enema on the morning of the operating day, or rather several hours before operation. The field of operation is shaved and thoroughly cleansed with soap and water, and then disinfected by a one-

Fig. 7.



Tait's new operation for incomplete laceration of perineum, taken from Sänger.

to-one-thousand sublimate solution. I generally employ, during operation, irrigation with a one-to-four-thousand bichloride solution,

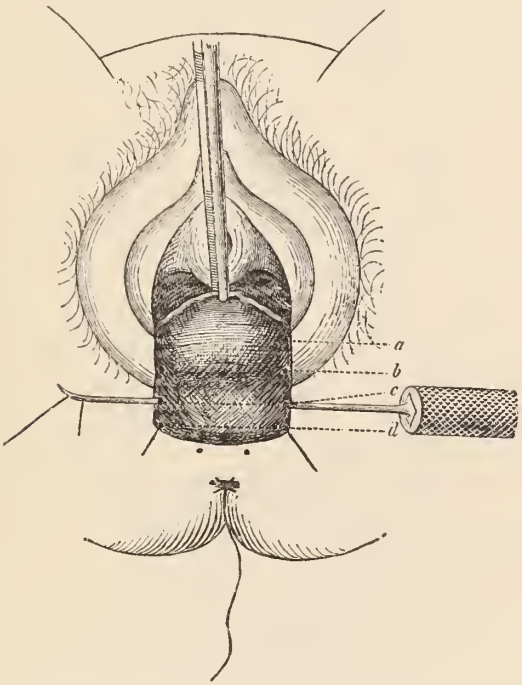
and in complete ruptures simple distilled or boiled water, or a weak solution of creolin. The legs are held in position by a Kelly leg-holder. The instruments necessary are a sharp-pointed scissors, preferably curved, a long Peaslee needle, an ordinary small curved needle and needle-holder for superficial sutures, one or two artery-forceps, and an equal number of tenacula, though the latter can easily be dispensed with. This is the whole instrumentarium necessary for this operation.

Tait's New Operation for Incomplete Ruptures of the Perineum.—It is well to introduce a tampon of iodoform gauze, with ligature attached, into the rectum, for the double purpose of causing bulging out of the posterior vaginal wall, and to prevent the escape of fecal matter during the operation. One or two fingers of the left hand are placed in the rectum in order to steady the vulva and posterior vaginal wall, then the points of the scissors are inserted transversely (Fig. 7) midway between the posterior commissure of the vagina and the anus as far as necessary, cutting first on the one side, then on the other side, undermining the whole cicatrix thoroughly to a point met by a straight line drawn from the external border of the junctnre of the small and large labia (Fig. 7, *a*). Turning the scissors then from the horizontal to the vertical position (*a b*, Fig. 7), the incision is prolonged along the left labium majus to the point at which we intend to form the posterior commissure, usually a little external to the lower border of the nymphæ (*b*). The same incision is repeated on the other side. The whole flap, which now presents a rectangular outline, is loosened and raised up by a tenaculum or the finger. The flap, when completely dissected off, loses its angular form and shrinks considerably, assuming an oval shape. It is lined by skin all around taken from below the perineum, and on the sides from the labia majora, except, of course, at its seat of attachment, where it is continuous with the vaginal mucous membrane. The bleeding is usually not considerable, and easily controlled by irrigation with hot water; sometimes, however, it is necessary to grasp a few small arteries with the forceps and twist them. Ligatures are very rarely required.

In regard to suturing material I have followed Sänger, who uses silver wire for the deep and silkworm-gut for the superficial sutures. Tait himself, it is said, also Mundé and others, uses silkworm.gut for all the sutures; others, again, prominently Martin, of Berlin,

unite the whole raw surface with rows of buried catgut sutures. With one or two fingers in the rectum, a Peaslee needle is inserted about an eighth of an inch from the left border of the wound, and carried under the whole raw surface, bringing it out at a corre-

Fig. 8.



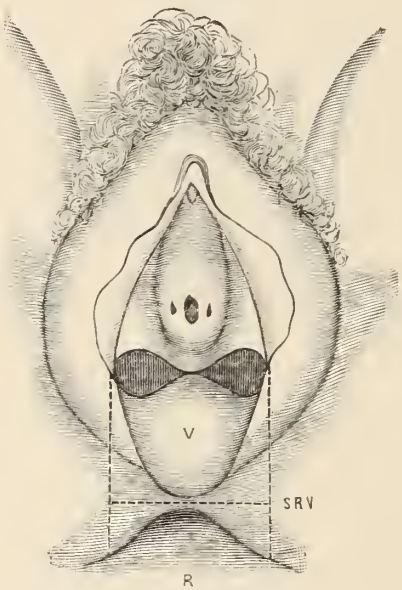
Method of inserting sutures, taken from Sänger.

sponding point on the opposite side (Fig. 8). The silver wire is then passed through the eye of the needle and the latter withdrawn. The wire is not tightened until all the deep sutures are placed. Care must be taken that all the sutures are buried but do not penetrate either the vagina or the rectum. One suture should pass behind the recto-vaginal juncture—*i. e.*, the place where the flap is attached to the rectum. More than three or four deep sutures are rarely needed. When the stitches are tightened, it will be found that the edges of the skin come together very nicely; when this is not the case, however, they are brought into contact by some superficial sutures. One or two superficial sutures are nearly always

required at the new posterior commissure of the vagina, where there is apt to be a little gaping. The superficial sutures are cut short, but the deep ones I am in the habit of leaving long, as they serve to hold the dressing in position. The wound is now washed off again with the antiseptic solution, dusted with iodoform, and covered with a layer of absorbent cotton.

Complete Rupture of the Perineum.—Here the operation differs very little from that just described. The torn recto-vaginal

Fig. 9.



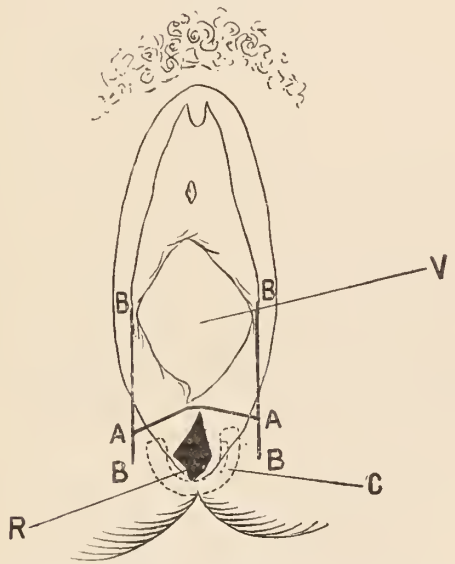
Tait's new operation for complete rupture of perineum, taken from Sänger.

septum is carefully divided transversely by scissors to a vertical line, drawn from a little outside of the juncture of the large and small labia (Fig. 9, S R V; Fig. 10, A A, and A B and A B); the incision is then extended up along the labia majora on each side. The vaginal being now finished, the rectal flap is made by carrying the incision downward to each side of the anus (Fig. 10, A B and A B), just outside of the stumps of the sphincter muscle (Fig. 10, C). The whole incision resembles the letter H. Now raising up the vaginal flaps with a tenaculum, and turning down the rectal flaps into the lumen of the rectum (Fig. 11), the raw surfaces will be

found in such close contact as if stitched together. The sutures are introduced in exactly the same manner as previously described (Fig. 11, S S S S), but it is very important that the last suture should pass through the torn ends of the sphincter ani muscles (Fig. 11, S B, S B).

The bowels are moved on the third day by a laxative, and unless regular, the laxative is repeated every other day. Only liquid diet is allowed the first few days. Instead of catheterizing the patient I have lately been in the habit of introducing a permanent

Fig. 10.



Showing lines of incision. (Made for author by Dr. C. S. Shaw.)

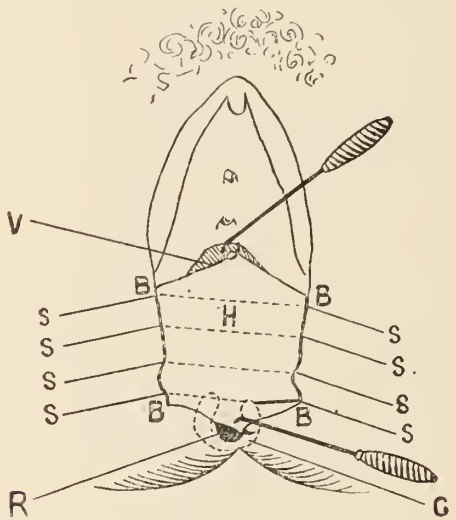
A A. Incision through recto-vaginal septum.
B B, B B. Incisions along labia.
C. Ruptured sphincter ani muscle.
V. Vagina.
R. Rectum.

catheter immediately after operation, consisting of a Skene-Goodman catheter, to which is attached a rubber tube two to three feet long, closed by a stop-cock. This is very convenient when the operation is performed in the patient's house and when no trained nurse is at hand. Even in hospital practice I have found the permanent catheter of great advantage, as it saves the patient and the

attendant much annoyance and, if made perfectly aseptic, there is less danger from cystitis. It does not give the patient any inconvenience whatever; in fact, it was left in the bladder in one case for seven days by mistake without causing the slightest trouble.

The after-treatment consists in changing the dressing of absorbent cotton whenever it becomes soiled, blowing some iodoform on the

Fig. 11.



Showing flaps raised and sutures inserted ready for tying.
(Made for author by Dr. C. S. Shaw.)
B B, B B. Incisions along labia.
C. Ruptured sphincter ani muscle.
H. Raw surface exposed by raising flaps.
S S, S S, S S, S S. Sutures in place.
V. Vagina.
R. Rectum.

wound each time. The wound should be irrigated after every motion from bowels or bladder. Vaginal injections are not necessary. The pain is usually very slight and anodynes are rarely required. The superficial sutures are removed on the eighth day and the silver wire on the fourteenth day. Sänger removes all sutures now on the twelfth day and allows the patient to leave the bed. The wound is generally perfectly healed at that time. Occasionally there is a small granular surface at the seat of the wire sutures, which, after

they are removed, heals in a few days. In two of my cases a small recto-perineal fistula formed. The first case had uterine prolapse, with cystocele and recto-vaginal fistula, there having been a rupture of the recto-vaginal septum and perineal muscles, leaving, however, the perineal skin intact. An operation for closing the perineal laceration had been done fifteen years ago, leaving a recto-vaginal fistula which had remained open ever since. I amputated the cervix, made an anterior colporrhaphy, using buried catgut sutures, closed the recto-vaginal fistula with catgut and restored the perineum by Tait's method, all at one sittting. Her bowels were moved on the fourth day by a laxative. On the sixth day she had great tenesmus, sitting on the bed-pan all day without being able to pass anything. When I saw her late in the evening I found a large, hard mass in the rectum which I had to break up with my hand. In washing out her rectum I noticed that some of the water was escaping through the perineal wound. The recto-vaginal fistula had evidently re-opened through her straining and permitted water and fluid feces to pass through. This fistula closed up, however, in a short time, and the result of the operation was very satisfactory.

The second case was an extremely unfavorable one for operation. There was not only a rent extending from two to three inches up into the rectum, but the rectum was prolapsed, protruding about two inches when the patient was in the horizontal position, but when on her feet or in the act of defecation it came down certainly six or seven inches. The rupture had existed for at least fifteen years, and during the last six months locomotion had become almost impossible. In order to make the flaps sufficiently large to cover the defect and to prevent their sloughing, the incisions were made very deep both up the vagina and into the buttocks. In this case a recto-perineal fistula formed because one of the silver wire sutures, of which there were seven, broke. Though at the last examination, about two months after the operation, there was still a small fistula present, it had contracted so that no fecal matter escaped through it. In order to retain the bowel and to secure it against prolapse, after returning the bowel to its normal position I passed one of the silver sutures through the external coat of the rectum. The patient has almost complete control of her bowel now and there is not the slightest tendency to prolapse. Physically the patient is now perfectly well, but her mind, which was slightly unbalanced

before the operation (due, as we thought, to her wretched condition), is now entirely deranged, so that her transfer to an insane asylum became necessary.

In my first operation I followed Sänger's advice to insert the sutures exactly at the edge of the wound, but within the wound surface. But I have found that when the sutures were tied the skin borders became slightly separated, requiring a number of superficial sutures to keep them coaptated. In the subsequent cases, therefore, I inserted the needle just within the skin, about one-eighth inch outside of the borders of the wound, thereby causing more accurate coaptation of the wound surfaces. If too much skin is caught within the stitches, it is apt to roll in, thereby preventing primary union.

In regard to the depth of the incision no definite rule can be given. In perineorrhaphy for incomplete rupture the flap does not need to be thick and fleshy, one-eighth to one-fourth inch being certainly sufficient. This will suffice also for the ordinary complete rents through the sphincter ani, but in cases of very deep tears extending high up into the rectum, such as the case just described, the dissection must reach a considerable distance above the rectal rent and into the buttocks, as we need a large, thick, and bloody flap, one that will not only be able to cover the very extensive defect but which will live and not become gangrenous.

My experience with this operation has been extremely satisfactory, though limited to eight cases. Three of these cases were complete lacerations, all of them healing by first intention except the one described, in which a small recto-perineal fistula remained, now rapidly closing up, however. The results have been perfect in each case, as also in five cases with incomplete ruptures. One of these was complicated with a recto-vaginal fistula of long standing, which I sewed up with catgut before performing Tait's operation. Zweifel and Sänger each report one case of fistula, for which no extra treatment was used, and both of which were cured permanently by Tait's operation for the repair of the perineum. In one case I amputated the cervix and performed anterior colporrhaphy at the same sitting. In two cases I performed trachelorrhaphy and in one trachelorrhaphy and curettement of the uterus.

Sänger reported at the last meeting of the German Society of Gynecology, at Freiburg, seventy-one operations performed accord-

ing to this method, ten of which were complete ruptures; none of them failed. Howard A. Kelly closed up a complete rent which had been operated ten times unsuccessfully, by Tait's new method, with an excellent result. P. F. Mundé operated seventeen times, eight complete and nine incomplete ruptures, with a perfect cure in each case except one, which, strange to say, died from septicæmia. In the August (1889) number of the *British Gynecological Journal*, Fancourt Barnes gave a complete history of twelve cases of complete laceration of the perineum operated on by Tait's new method, in all of which perfect cures were obtained. I might add the reports of many other operators, but I think this list will be sufficient to convince the most inveterate sceptic of the efficiency of the operation.

There is certainly no operation that can compare with this in simplicity, celerity of performance, and uniform success. For complete ruptures I regard it as the ideal method which, in my opinion, is destined to supercede rapidly the old triangular operations which so often fail. In this operation the success does not depend, as in the triangular methods, on the behavior of the sutured vaginal and rectal mucous membrane; but, to use Sänger's words, "on the rapid, certain, and firm cicatrization of the perineal skin." The occurrence of recto-vaginal fistulæ, so common after the older methods, seems impossible after this operation. Should primary union of the perineal wound fail to take place at certain points, this will not mar the success of the operation, as, especially when the posterior vaginal commissure and the sphincter ani muscles have united, secondary union will always take place. Even a total failure would at least not increase the trouble, as no tissue has been removed, and the parts simply remain *in statu quo*.

DISCUSSION.

Dr. W. H. Wathen, of Louisville, Ky.—Just one year ago to-day I read a paper before this Association, in which I remarked that I knew of no subject about which there was so much pseudo-scientific rubbish to be brushed away before we got down to the kernel of the theme. So much that is practically worthless has been written about it that the medical mind has become confused, and does not seem to grasp the

essentials of the operation; a very simple operation that ought to be almost universally successful has been made to appear so complicated that it is seldom correctly or successfully performed. I have, with one exception, never failed to get a good result, and generally a perfect cure, in operations for complete or incomplete perineal rupture. I have no concern about sepsis. I have not had a case of primary or secondary complete rupture in which the patient failed to control the feces and gases after operation. Patients have reported to me one, two, or three years afterward, so that I have been enabled to verify these points. I agree with Dr. Price, that we owe much to Dr. Emmet, but he has not done all the good work. To him, however, we owe the principle that enables us to unite the ends of the sphincter ani muscle; and that is the great desideratum. Without this union we always have incontinence of feces and gases; with it, we have complete success.

I regret that in this country, and even in New York, Dr. Emmet's home, distinguished gynecologists are operating without observing this rule, and consequently are not getting good results. A lady in Louisville had her perineum lacerated. She was operated on by her physician without success; she then was sent to New York and was operated on with only partial success, because the ends of the sphincter ani were not united. The flap-splitting process supplements Dr. Emmet's operation, and is followed by much better immediate and subsequent results than the superficial denudation. You cannot repair the pelvic floor permanently unless you cut down upon and dissect free the torn layers of fascia of the pelvic floor, and the ends of the muscles as well; otherwise there will be imperfect control of the feces and gases, and if there is rectocele or cystocele, it will not be cured. But, if you denude the ends and dissect up the fascia and the muscles by the splitting process, and unite them, you bring about a condition that does not admit of vaginal prolapse, and thereby get a perineum very nearly as perfect as before it was torn. The splitting process is very simple. I see no object in making a quadrangular splitting, as suggested by Dr. Werder. There is no indication to my mind that should induce us to do it. With one or two fingers in the rectum as a guide, in partial ruptures, the splitting may be done in five minutes. The knife should be introduced just in front of the anus, at the muco-tegumentary junction, and pushed up under the tissues until they are divided as high up as is needed; then, by cutting deeply on each side, the muscles and fascia will be exposed. The outer line of the incision must follow the line that marks the junction of the skin and mucous membrane. If the rupture extends into the bowel, then the lateral incisions should go deep enough to expose the ends of the sphincter ani muscle, and be

made on the sides of the labia, just as in the incomplete cases. The recto-vaginal septum should be separated from a quarter to half an inch, by carefully dissecting the vagina from the rectum through the connective tissue. Bleeding is not so troublesome as that following the superficial denudation, and can usually be quickly stopped by sponging, irrigation, exposure, or torsion, or a fine gut ligature may be thrown around the bleeding vessels.

Capillary bleeding does not delay the operation, for, if the parts are in perfect coaptation, the pressure will control hemorrhage, and union will not be interfered with. Where any form of an aseptic animal suture is used, the needle should be introduced, and brought out just within the lower or external edges of the raw surfaces, so that when they are united the suture will be concealed or buried in the tissues. Sometimes a few superficial sutures will be required. The sutures should be so introduced as to be entirely covered by the tissues, and to bring the surfaces into even and exact position. If the sphincter ani is ruptured, I always use the base suture after the fashion of Emmet. In incomplete ruptures the deep-buried animal suture, used after the fashion of Marcy and Schroeder, may serve an excellent purpose in the practice of an expert operator; and, where the splitting has been made extensive, the parts are brought more perfectly in apposition by using a continuous suture, or one or more separate sutures at the bottom of the wound, before introducing the deep perineal sutures.

In complete ruptures, about three or four deep sutures will be required, and sometimes that number is needed where the sphincter ani is intact. If the rent in the recto-vaginal wall extends up more than an inch, it is usually necessary to suture this part before introducing the perineal sutures, but the operation should be completed at one sitting.

When the tissues on each side and at the apex of the rent are deeply split, the recto-vaginal surfaces should be well separated and brought together by one or more sutures, after the fashion of Mr. Tait in his vesico-vaginal fistule operations; or, if this cannot be done, the split edges may be united by interrupted sutures, or by a continued suture, so introduced as to be buried in the flaps, going into neither the vagina nor the rectum.

This operation exposes and brings together the ends of the perineal muscles and fascia, and the fascia that holds the rectal and vaginal walls in position, and, moreover, restores the perineum and the pelvic floor to nearly a normal condition, with about the same resisting power as before the injury occurred. In operating for incomplete ruptures with rectocele, the recto-vaginal septum should be split up to nearly the apex of the vaginal protrusion.

No tissue should be destroyed except jagged edges in some complete ruptures; the dissected part assists in protecting the wounded surface against the dangers of infection from uterine and vaginal secretions, and also increases the thickness of the perineum. I have never had a recto-vaginal fistule after an operation for complete rupture, nor do I believe it will often occur if the operation is correctly done.

I am opposed to keeping the sutures in for ten to fourteen days; I send my patients home in fourteen days. If you get primary union before ten days, you will secure all the union you will ever obtain. I do not believe it is essential to draw the urine, and I certainly would not be willing to leave a catheter in the bladder. I doubt if the urine has any deleterious effect on a perineum aseptically treated. The bowels should be moved well daily for a week before the operation, and on the third day after the operation, and each subsequent day, they should also be moved. The woman should take no solid food, but there is a liquid food that is the worst diet that can be fed in perineal rupture —I mean *milk*. It forms *hard* fecal masses that cannot be easily gotten away without injuring the union of the surfaces.

Dr. Hoffman's description of the intense pain women suffer after the splitting process does not harmonize with my experience.

After using the buried suture, supplementing it by Emmet's deep suture, there is so little pain that I do not ordinarily give an opiate. Dr. Price's assertion that the splitting process is a retrograde step, I consider entirely erroneous. It is another improvement added to the work of Dr. Emmet.

A primary operation is much simpler than a secondary one. If the operation is performed within from one to eight hours after the rupture, and is done aseptically and correctly, even in complete rupture success should be almost universal. I remember an operation I did, for a colleague, where the perineum was ruptured an inch and a half up the bowel, and the posterior vaginal wall was torn three inches; it was carefully sutured, but the after-treatment was neglected, and the sanitary and the hygienic conditions were bad. The urine was not drawn and the vagina was washed out but once or twice. On the tenth or twelfth day, I found her three rooms back nursing her babe. There was no pus, and the parts had united firmly and completely.

Dr. Joseph Hoffman, of Philadelphia.—I desire to say very little about this operation, merely to notice some of the essential failures. Any operation that has to do with muscle which is said now and then to fail, and still to give good results, is incomprehensible to me. An operation that is going to control the sphincter must heal by first intention or not control it. I cannot see how we are going to get

anything out of an operation which deals only with the skin, except failure. So far as the Tait operation is concerned, I do not think Mr. Tait himself deserves any credit for originality in the procedure. It was Simpson's originally, as I understand it, and has been modified, running from one degree of inefficiency to another. I do not think that pyemia in a simple perineal operation is justifiable. The original Tait operation, which was transforming a transverse slit into a vertical one, causes excessive pain. The chief objection to all such operations is that they attempt to cure by anatomical distortion—bringing parts into apposition which have no natural relation.

Dr. Joseph Price, of Philadelphia.—I have given this subject very considerable study and consideration. I have also seen a number of flap-splitting operations at home and abroad. I have always felt in regard to them as I have felt in regard to our deeper surgery; that is, for a long time our surgeons worked on the skin and then gave it up to dermatologists. To discuss this question intelligently you must go to the bottom of the lesions, the accidents incident to parturition. I never saw a tear begin on one side only. Tears in a large number of cases are left-sided rents. Some of you will reply that these are vaginal tears. I refer to perineal tears. I am talking about injuries to the pelvic floor and perineum. It is a very common thing to have the whole pelvic floor pushed up in advance of the child's head and broken down. Sometimes this occurs absolutely post-vaginal. Leaving the skin intact, almost the condition which I find in an imperfect result in the flap-splitting operation—you might just as well put a tight pair of drawers on your patient; it will do just as much good. After completing such an operation introduce your finger into the bowel and see if the condition is changed at all. You have nothing but the mucous membrane of the vagina and rectum between your finger, and a skin perineum extending farther forward than in normal conditions.

Emmet has taught us more than all the rest of the world in plastic work on injuries to the pelvic floor, and is fifteen or twenty years ahead of most of the profession at present. In complete sphincter tears you must surely expose the ends of the sphincter muscle, the same as any other muscle, if you are going to bring them into apposition. You will find after completion of the flap-splitting operations deep dimples on both sides, the sphincter muscle not having been touched. Incontinence of gas and feces remains the same.

One of the cases referred to by Dr. Werder lives in Pottsville, after the tenth operation, and will require the eleventh operation to restore her sphincter. I look upon the flap-splitting operation as a retrograde

step, and all two- and three-stitch methods as incomplete. In Mr. Tait's operation many of them are failures as far as I can tell. You fail to restore the pelvic floor with most methods except the Emmet procedure. You apply to the perineum principles that you would apply to no other part of the body.

I am surprised that more of the patients do not die of tetanus after the use of the big bayonet-handled needle. It is a dangerous instrument. Some of these methods of closing up the perineum add a little more power to the internal sphincter. The woman will suffer less with the Emmet procedure than with other methods, notwithstanding she is under the influence of opium.

Dr. J. H. Carstens, of Detroit, Mich.—I agree with Dr. Wathen in regard to the use of the catheter; that is to say, I do not think we need it at all, or only exceptionally. I do not regard it as wise to syringe out the vagina too much after perineal operations. I think the washing, especially by an untrained nurse, often does more harm than good. This operation of Tait is one I suppose every one of us has performed in nearly all its details. These various modifications of perineorrhaphy are all good in proper cases. I can recall a case where a woman with complete rupture of the perineum has perfect control of feces and gases, due to the retentive power of the internal sphincter. Some of these cases have subinvolution of the vagina. The point I desire to lay stress upon is, that each case must be judged according to its own peculiarities and operated on accordingly; that there is no one operation absolutely correct for all, but we have sometimes to make use of two or three different ideas of as many different authors in one operation.

Dr. Werder (closing the discussion).—My paper has caused a great deal of criticism. I expected this criticism from some of the members from Philadelphia, because I know they are wedded to Emmet's operation. I have nothing to say against Emmet's operation; but there are other operations equally as successful, and they have the advantage of being much simpler, and more easily and quickly performed, than the operation of Emmet. One of these is that of Tait. Dr. Hoffman says the sphincter must heal by first intention, or it does not heal at all. In all my operations the sphincters have healed. In every one of the complete ruptures there was complete retention. In the case I spoke of in which a recto-perineal fistula had formed, the patient's mind has become deranged; her statement, therefore, cannot be fully relied upon. Her nurse, however, tells me that she not only has no involuntary discharge, but good control over her feces. This was an unusually bad case, the rectum being prolapsed at least two inches, while during defecation it came down to the extent of six or seven inches. I think, therefore,

that the result in this case was most satisfactory, even though for a time a fistula existed.

Dr. Hoffman also says that an operation which results in pyemia is not a good operation. He knows very well that a small cut in a finger has caused pyemia. That is no argument at all against this operation.

Dr. Price says that Tait's perineal operation only gives a skin perineum. I am very sorry he has not had an opportunity to examine these cases with one finger in the vagina and the other in the rectum. He would find that the result of the operation is not only a very thick, but a high perineum—one which gives firm support, probably as good as before the laceration. He also makes the bold assertion that the sphincters are not restored. If not, how do these people have full control of the bowels? Complete control was obtained not only in my cases—the three cases might not be sufficient to prove anything—but also in the other cases reported; ten cases by Sänger, eight or nine by Mundé, and twelve by Fancourt Barnes, all competent men, who would know whether there was complete retention or not. I do not see why we should not be able to expose the ends of the torn muscles and bring them into apposition by flap-splitting, as perfectly as in any other operation.

In answer to Dr. Wathen, I would say that by liquid food I mean broths principally.

Dr. Carstens says everybody has been doing this operation; if it is commonly done, I have not been able to see any record of the fact in our literature.

THE NECESSITY OF RECOGNIZING THREE PLANES IN THE OBSTETRIC PELVIS.

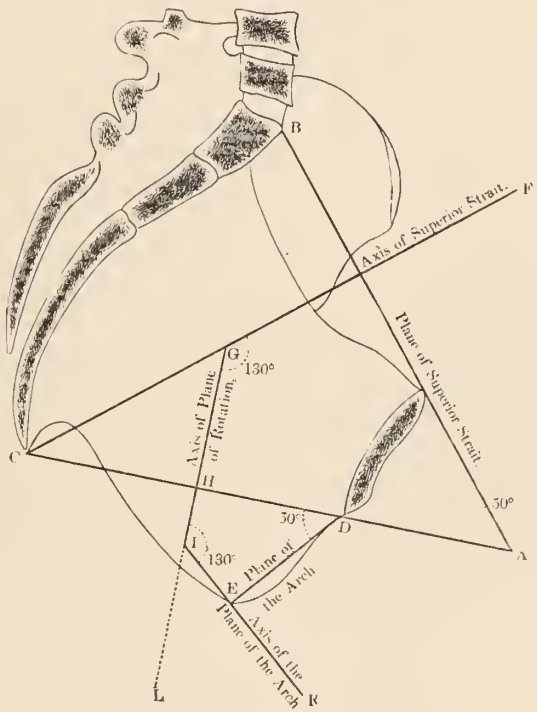
By WILLIAM WOTKYNS SEYMOUR, M.D.,
TROY, N. Y.

With the seventeenth century began the scientific study of obstetrics, but during that period all efforts were directed to the discovery of instruments or the improvement of manual or instrumental procedures. With the next century began an attempt to ascertain the inclination of the superior strait of the pelvis and to determine the direction of its cavity. Deventer (1701) recognized that the pelvic cavity looked forward and that the two straits were not parallel. Mueller (1745) described the superior strait as making an angle of forty-five degrees with the horizon, and was the first to speak of an axis of the pelvic cavity; this was a line drawn from the umbilicus to the tip of the coccyx, and was supposed to be perpendicular to the horizon. Roederer's (1751) axis was equally absurd, being a perpendicular line to the middle of the coccy-pubic diameter, and regarded by him as passing through the umbilicus. In 1753 Levret described the pelvis as having three axes. These he drew as follows: He assumed, 1st, the superior strait to be inclined to the horizon at an angle of thirty-five degrees; 2d, that a horizontal line drawn through the top of the symphysis pubis would meet the junction of the two lower sacral vertebræ; 3d, that if from the tip of the coccyx a line should be drawn parallel to the superior strait it would pass through the inferior part of the vulva. On these lines he erected perpendiculars, and by their means obtained, as the curvature of the pelvic cavity, a parabolic line, which Danyau, the translator of Naegele, says better represents the curve of the pelvic cavity than the various arcs of circles since employed.

It was about this time that Sir Fielding Ould discovered the rotation of the head. Bang, in 1744, made a close approxima-

tion to the standards at present accepted, inasmuch as he regarded the superior strait as at an angle of fifty-five degrees with the horizon, and the inferior of three and one-half degrees. Saxtorph, in 1790, made several axes, but his descriptions are so vague that it is impossible to gain any definite idea of them. Naegele, in 1825, as a

Fig. 1.



A B = Plane of the Superior Strait or Entrance.
A C = Plane of Middle Strait or Rotations.
D E = Plane of the Arch or Exit.
F G, Axis of Superior Strait.
I J, Axis of Middle Strait, identical with axis of "Inferior Strait."
I K, Axis of the Plane of the Arch.

result of many measurements of the living and study of the dry pelvis, established the relation of the superior strait to the horizon as sixty degrees, and that of the inferior ten degrees; or, in other words, that when prolonged, the two straits made with one another an angle of fifty degrees. This has been generally accepted as the

true relation of these planes, and these planes have been generally taught to be the planes of entrance and exit from the bony pelvis.

After Naegele, no advance was made in the study of the normal pelvis until Hodge, by his parallel and vertical sections of the pelvis first determined the true relations of the anterior and posterior lateral inclined planes, the dimensions of the pelvic cavity, and the true curvature of the parturient canal. He first taught why, with a coccy-pubic diameter considerably in excess of the diameters of the head engaged, it was necessary to depress the coccyx. He insisted on the absolute synclitism of the head in passing each plane, and instead of the usual slovenly division of the second stage of labor into the five periods, one of flexion, another of descent, a third of rotation, a fourth of extension, and a fifth of external rotation, substituted a division into five periods which, with the modifications resulting from the recognition of three planes, are true of each and every kind of labor. Hodge's periods are as follows: "The first, embracing the passage of the head through the superior strait and os uteri; second, the descent through the canal of the pelvis to its outlet; third, its passage through the inferior strait; fourth, through the os vaginæ; and fifth, the delivery of the body of the child in cephalic presentations, or of the head in pelvic presentations." It will be noticed that Hodge, as the second period of the second stage, gives descent through the canal of the pelvis to the *outlet*, and as the third, the passage through the *inferior strait*. It is just here that we must differ from Hodge and all other obstetric teachers. *The inferior strait, so called, is not the outlet of the bony pelvis; and not being the outlet, has, as it is commonly represented, no physiological function.* This inaccuracy was particularly owing to the fact that the so-called inferior strait was not only a true plane, having its antero-posterior and transverse diameters in parallel planes one and one-half inches apart and its oblique diameters in still a third plane parallel to neither of the others, but also because, although commonly described as the plane of exit from the bony pelvis, it was only by discarding as obstetric factors all the parts lying below the coccy-pubic diameter and taking as the line of exit the perpendicular to the middle of the coccy-pubic diameter that this could be true. This would give as determining lines for the curvature of the bony pelvis only two axes and would reduce the mechanism in woman to the simplicity of that in the mare.

We know that normally the child does not emerge through the

anus but through the vulva, yet it does not appear by any means clear that obstetricians recognize the simple fact that the vulva is in the anterior wall of the pelvis, and that its attachments are such that the fetus must pass out of the bony pelvis through the anterior wall, and not in the axis of the anus, as in the mare. If one will observe Fig. 2, Plate I., from Savage, he will quickly see that the anatomical exit from the bony pelvis lies directly within a plane corresponding to the pubic arch, and that no amount of distention, short of actual rupture of this aponeurotic and muscular septum during labor, can permit the child to pass out in the axis of the "inferior strait." Recognizing this anatomical ground for a re-consideration of the pelvic planes, my father, William P. Seymour, at that time professor of obstetrics at Albany, instead of the "inferior strait" made of it two planes having distinct anatomical and physiological justification—the plane of the middle strait, or plane of rotation, and the plane of the arch, or plane of exit.

Before entering upon a consideration of the plane of the arch, it is desirable to call attention to the fact that the gynecological pelvis and the obstetric pelvis are entirely different. In the gynecological pelvis the pelvic floor is marked by a distinct straight sulcus which is at a considerable height above the tubera ischii, while the obstetric pelvis is only completed in the final stages of labor, when the advancing fetal extremity has completely distended the soft parts constituting the pelvic floor and the posterior part of the plane now to be described.

Plane of the Arch, or Plane of Exit.

The plane of the arch is only completed in the final stages of labor. It corresponds to the aponeurotic and muscular septum normally closing the arch in the anterior wall of the bony pelvis. According to Savage, this arch is closed except at the vulvar orifice by three layers of fasciæ on and between which are placed various muscles. The superficial layer of fascia is continuous with the subcutaneous fascia on nates, thighs, and abdomen, but the deeper layer "in descending from the abdomen is narrowed to the width of the pubis, whence it spreads out, in descending, so as to cover in the anterior perineal triangle down to its base, the lower border of the perineal septum." "The perineal portion is firmly adherent

to the outer margins of the ischio-pubic rami, and to the lower border of the septum."

Savage, Fig. 2, Plate I., and Figs. 1 and 2, Plate II. As the posterior limit of this anatomical arch, we have beneath the superficial fascia the transverse perineal muscles arising from the rami of the ischii a little above the anterior extremities of the tubera and interlacing with each other and the fibres of the perineal body. These muscles lie between and are invested by the superficial and deep fasciæ which unite at the posterior border to form the ischio-perineal ligament, which is regarded by Savage as the boundary between the anterior and posterior perineal triangles. The transverse diameter of the plane of the arch is drawn from the anterior extremity of one tuber ischii to the corresponding point of the other tuber ischii, and in the average female pelvis measures four inches. The transverse diameter of the "inferior strait," it will be remembered, was drawn between the posterior extremities of the tubera, and was, by reason of their convergence in front, much longer than the transverse diameter of the arch drawn between the anterior extremities. The antero-posterior diameter is a perpendicular drawn from the subpubic ligament to the middle of the transverse diameter, and is only completed when there is complete synclitism of the head with the plane on its exit from the bony pelvis. This superior portion of the antero-posterior diameter is two inches in length. The middle strait, or plane of rotation, which I will soon describe, has as its antero-posterior diameter the coccy-pubic diameter, and the plane bears to the plane of the arch the same relation—that of fifty degrees, which Naegele established for the relation existing between the planes of the superior and inferior straits.

Demonstration.

The transverse diameter of the plane of the arch lies in a plane parallel to and $1\frac{1}{2}$ inches below the plane of the middle strait. We therefore have in Fig. 2 in the triangle E D H:

E D = the height of arch = 2 inches.

D H = the distance between the middle strait and the transverse diameter of plane of arch = $1\frac{1}{2}$ inches.

And E H D = 90 degrees $\therefore$ R : E D : : sin D E H : D H R :

2 : : sin D E H : $1\frac{1}{2}$ sin D E H $= \frac{1.5}{2} = 0.75$ sine of 49.7 degrees.

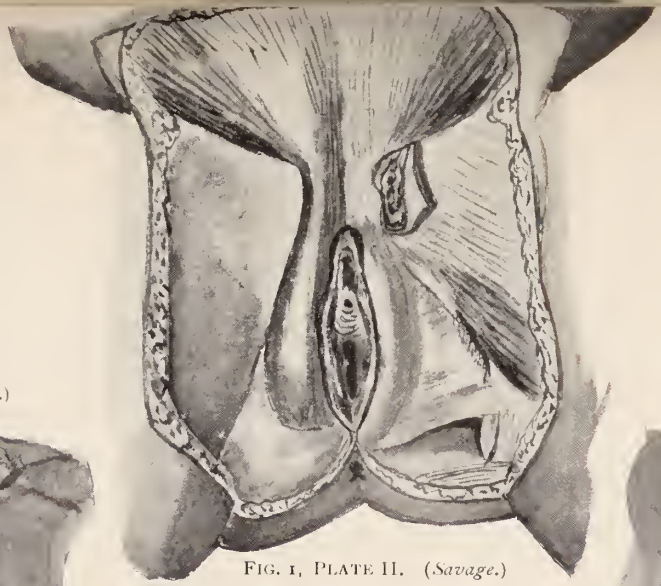
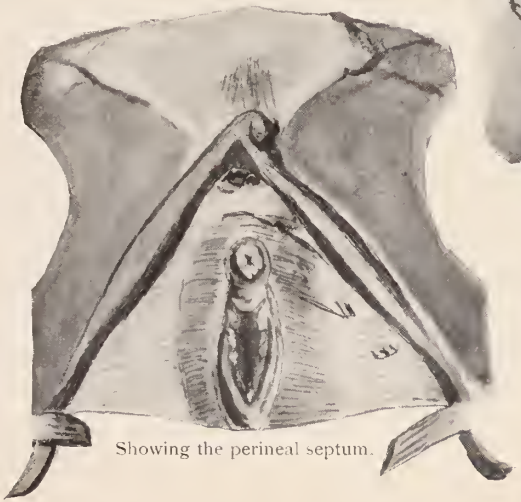


FIG. 1, PLATE II. (*Savage.*)

Showing the two layers of the superficial fascia.

FIG. 2, PLATE I. (*Savage.*)



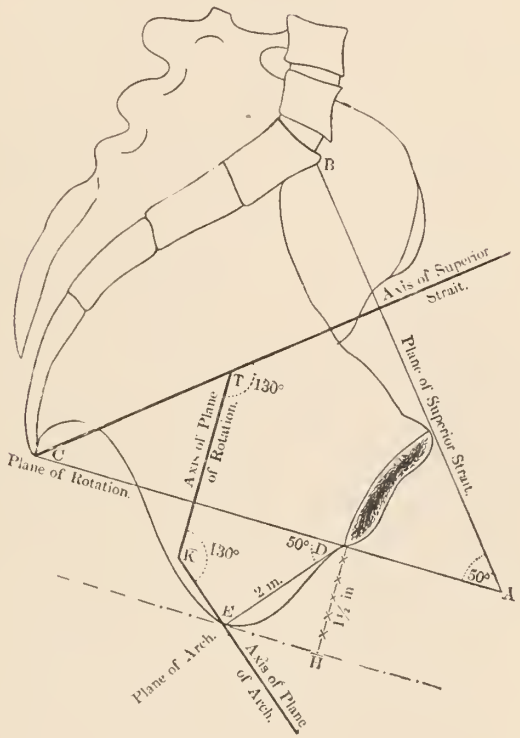
Showing the perineal septum.

FIG. 2, PLATE II. (*Savage.*)

Showing the boundaries between the anterior and posterior perineal triangles.

If, however, we take D E H = 50 degrees, and have D E unknown, we have R : E D : : sin 50 degrees : 1.5, or R : x : : 0.766 : 1.5 ∴ D E, or $x = \frac{1.5}{0.766} = 1.95$ inches.

Fig. 2.



In triangle E H D:

D H = the diameter between the middle strait and the transverse diameter of the plane of the arch 1½ inches.

D E = the height of the arch, 2 inches and E D H.

∴ R : 2 : : sine D E H : 1½.

R : E D : : sine D E H : : D H.

Sin D E H $= \frac{1.50}{2} = 0.75$ sine of 49.7°—that is, D E H or its alternate angle C D E.

From which it may be seen that a difference of $\frac{1}{20}$th of an inch in depth of the arch makes a difference of nearly 1 degree in the angle formed by the planes of the middle strait and arch. If E D, the depth of the arch, remained two inches, and the angle of the

planes of the middle strait and arch 50 degrees, the line D H would be 1.532 inch. That is, an increase of $\frac{32}{1000}$ths of an inch in the distance of the tuberosities from the middle plane would increase the angle D E H, or its alternate C D E, 1 degree. Thus the relation of the plane of the middle strait and the plane of the arch is the same—50 degrees—as that commonly recognized as existing between the planes of the superior and inferior straits.

The Middle Strait, or Plane of Rotation.

The middle strait is considered as a plane passing through the coccy-pubic diameter in such a manner that corresponding opposite points on the linea ileo-pectinea are equally distant from the surface of the plane. Its antero-posterior diameter corresponds to the coccy-pubic diameter, and its transverse to a line drawn in the plane perpendicular to the middle point of the coccy-pubic diameter. These diameters average four inches, but when the coccyx is forced back the antero-posterior diameter becomes four and one-half inches or more. By reason of the origins of the pubo-obturato-coccygeus muscles, it is in this plane that the phenomena of rotation occur and are completed. The pubo-coccygeus muscle (Savage) takes its rise from the inner surface of the pubis by distinct muscular strands, the median fibres descend by the side of the urethra and vagina, some of them turning in between vagina and rectum to meet similar fibres from the opposite side in the perineal body. Another group turns in beneath the rectum and interlaces with its opposite fellow and the internal sphincter, while a remaining group unites with the opposite group to form a median raphé extending from the coccyx to the anus. The obturato-coccygeus muscle arises from the curved aponeurotic line of junction between the obturator fascia and recto-vesical fascia, and its converging fibres are inserted into the sides of the last two coccygeal bones. The origins of these muscles are an inch above the middle strait, and it is these muscles which catch the descending head in their bite and determine the anterior rotation of the occiput. Hodge, by his vertical sections of the pelvis, clearly showed that it was in a vertical section nine lines in front of the sacro-iliac synchondroses and through the spines of the ischii that the division between the anterior and posterior lateral inclined planes lay, and it is just at the spine of the

isehium that the origin of the obturato-coccygeus muscle terminates. Hodge is the only author who thus divided the anterior and posterior lateral inclined planes, and by the chord line of his parallel sections has shown why the occiput rotates anteriorly, even when posterior to the transverse diameter of the superior strait, if the occipital protuberance is in front of the spine of the isehium.

In order that labor should be most favorable, it is necessary that the most favorable diameters of the head should engage in these planes in sueeession. The most favorable diameters of the head are the suboccipito-bregmatic and bi-parietal, and are included in the occipital plane of the head. Sueh being the ease, the head well flexed enters the bony pelvis in an oblique diameter and passes through the superior strait with the occipital plane of the head in a state of complete synclitism with the superior strait. Having passed this plane, the head extends somewhat and descends in the axis of the superior strait until the occipital extremity enters the third parallel section of Hodge (a line drawn through the spines of the ischii parallel to the superior strait). At this point begins the origin of the pubo-obturato-coccygeus (levator ani) muscle. This muscle, having its origin from the sides of the pelvis from the spine of the isehium to the pubis, and its insertion in the coccyx and the median raphé, forms a deep trough closed behind and open before, in the bite of which the advaneing head is caught and determined anteriorly. The anterior fontanelle is found at the right saero-sciatie ligament, and the right leg of the lambdoidal suture is parallel to the left ramus of the ischium, while the left cuts the latter almost at a right angle. As labor progresses, the anterior fontanelle is seen opposed more and more to the coccyx, the occiput descends further and further and turns gradually more to the front until the occipital extremity is found in perfect synclitism with the middle plane. It is then, and then only, that rotation is shown to be complete. The occipital plane of the head is passing the plane of the middle strait, the plane of exit of Hodge and others, but it still has to revolve through the whole 50 degrees, between the middle strait and the plane of the arch, before it can make its exit in the arch from the bony pelvis in complete synclitism with that plane also. At this period of labor the posterior fontanelle will be found deep

in the pelvis, the sagittal suture at the point of the coccyx, and the legs of the lambdoidal suture bisected by the antero-posterior diameter of the plane of the arch. During this rotation of the head, as was first clearly shown by Hodge, there has been a depres-

Fig. 3.

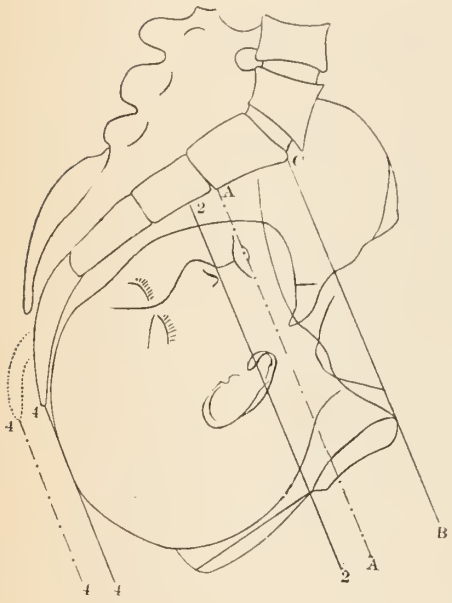
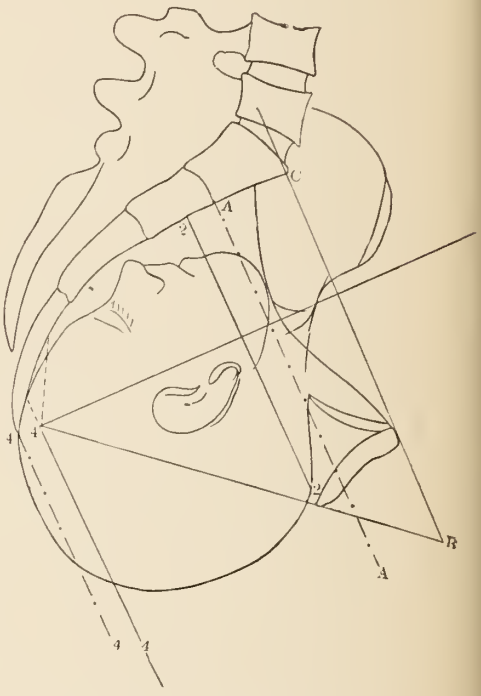


Fig. 4.



B C = Superior Strait.

2–2 = Hodge's 2d parallel section—a line drawn parallel to the superior strait through the subpubic ligament.

4–4 Hodge's 4th parallel section modified. The original was merely a circle described about the coccyx parallel to the others. The modified parallel section is drawn parallel to the others from the tip of the coccyx, and is continued anteriorly through the dilated soft parts.

sion of the coccyx so as to gain room, not in the coccy-pubic diameter, as is commonly taught, but in the depth of the pelvis, so as to allow the $3\frac{1}{2}$-inch head to pass out under the arch, which it cannot do so long as the coccyx is not depressed; for, owing to the depth of the pelvis from superior strait to coccyx being $4\frac{1}{2}$ inches and the symphysis pubis being $1\frac{1}{2}$ inches in height, there remain only three

inches for the $3\frac{1}{2}$-inch head to pass through under the arch. By this depression of the coccyx the vertical depth of the pelvis is increased $\frac{1}{2}$ inch or more, and then, even deducting the $1\frac{1}{2}$ inches, the height of the symphysis, there is left a clear $3\frac{1}{2}$ inches for the head in passing out through the anterior wall, or plane of the arch. In Fig. 3, the head is shown partially flexed and not as yet rotated. When the anterior fontanelle is opposed to the right sacro-sciatic ligament, the base of the head will be above the line A A, and lying one-half inch or more above the second parallel section. It is, therefore, necessary that the depth of the pelvis should be increased by forcing back the coccyx so that the fourth parallel section (line through coccyx parallel to superior strait) will take the position of 4 . . . 4 in Figs. 3 and 4. We have already shown that coincident with this forcing back of the coccyx are the completion of rotation and the entrance of the occipital plane of the head in a state of complete synclitism with the middle plane. At this stage the suboccipital extremity of the head will be found at the subpubic ligament, and the whole base of the head below the second parallel section—that is, below the symphysis pubis, and the head, now resisted at the point of the coccyx and the subpubic ligament, but still subjected to uterine contraction, descends a short distance in the axis of the middle strait T K, Fig. 2, and then begins its extension outward to and through the arch. The posterior fontanelle which was recently deep in the pelvis, with succeeding pains rises more and more, until it finally enters the plane of the arch in a state of complete synclitism. In other words, the suboccipital extremity being opposed to the subpubic ligament, the suboccipito-bregmatic diameter revolves around the subpubic ligament as a centre, as described by Hodge, and not in the curve of Carus or Bang, and the head issues from the bony pelvis in a state of synclitism with the plane of the arch D E, Fig. 2, in the axis of the plane M E, Fig. 2, and not in the line T K, as commonly taught.

We, therefore, have three obstetric planes in the pelvis:

1st, *The superior, or plane of entrance;* 2d, *The middle, or plane of rotation;* and 3d, *The plane of the arch, or plane of exit,* each with distinct physiological and obstetrical functions.

1. Hodge, who in his magnificent description of the mechanism of labor, surpassed all writers of any or all countries before or since in the accuracy of his observations, has indeed described the

true curve of the parturient canal, the true line described by the fetal head in its transit through the bones and the soft parts, but even he ignored the importance of all the parts lying below the coccy-pubic diameter, and in regarding the "inferior" strait as the exit, confounded in so doing the functionally distinct planes of rotation and exit, the planes of the middle strait, and the arch. In his description of the third period of the second stage, Hodge says:

"This consists in the transit of the head through the inferior strait of the pelvis. The rigidity of the tissues, and especially the small comparative size of the inferior strait, often render this passage painful, tedious, and dangerous. It is here that instrumental assistance is more frequently demanded than under any other circumstances. The practitioner, therefore, should be accurately acquainted with nature's mode of delivery, that he may successfully assist in cases of emergency." "We have already shown that the head approximates the inferior strait in an oblique direction, but when rotation is completed, the base of the occiput is under the subpubic ligament. It will now be found that the occipital protuberance projects somewhat through the orifice of the vagina and the head is slightly oblique. Under the powerful bearing-down efforts of the mother, the head is driven down, and the occipital protuberance continues to advance through the orifice of the vagina, until the nape of the neck is arrested by the symphysis pubis, by which time the head is nearly or quite engaged within the circle of the 'inferior strait.'" "If a careful examination be now instituted, the base of the occiput will be found at the top of the arch of the pubis, the right parietal protuberance near the right tuber ischii, and the left parietal protuberance toward the left tuber ischii. If the finger be placed in the rectum, the bi-parietal suture will be found corresponding to the middle line of the perineum and the anterior fontanelle opposed to the os coccygis." "It will also be noticed that the posterior commissure of the vulva stretches over the head, very nearly in the direction of the lambdoidal suture, so that the posterior fontanelle is found covered by the perineum, and toward the centre of the inferior strait, midway between the tubers of the ischia, and also between the symphysis pubis and os coccygis; and is, therefore, the true 'presenting part' of the head at the inferior strait of the pelvis; it follows, therefore, that the forehead and face of the child are turned toward the sacrum, and that the chin points to the upper or first bone of the sacrum." "Hence it results that by this process of descent, rotation, and partial extension, the occipital extremity of the head, which passed perpendicularly through the superior strait, os uteri, and the different planes of the pelvis, has now entered perpendicularly into the circle of the inferior strait, the vertex or occipital foramen presenting at the centre." "Hence, the occipito-mental diameter will be found coincident with the axis of the inferior strait of the pelvis, the biparietal parallel to the transverse diameter, and the cervico-bregmatic parallel to the antero-posterior diameter; in other words, the head engages at the inferior precisely as it did at the superior strait with the cervico-

bregmatic circumference. At the superior, however, great flexion existed, but at the inferior the head is partially extended, being thus accommodated to the obliquity of the inferior plane as compared with that of the superior. *As soon as the parietal protuberances pass the rami of the ischia, this period of labor terminates and the fourth commences.*" (Italics mine.)

By the line: "as soon as the parietal protuberances pass the rami of the ischia," he glosses over the whole change of direction of force from the axis of the "inferior strait" to the axis of the arch, a revolution through an arc of 50°. This confusion of the two phenomena of rotation and exit from the bony pelvis is further shown in the succeeding passages describing the fourth period of the second stage. This latter embraces, according to Hodge, the passage of the head through the lower portion of the vagina and its external orifice. After speaking of the fact that with relaxed tissues the passage of the bones and soft parts is rapid, or even instantaneous, as if comprised in the passage of the inferior strait, his third period, he proceeds:

"In primiparous patients, however, where there is the usual tonicity of the perineum and of the vagina, the head is resisted for a long time, especially toward the external orifice, rendering repeated bearing-down efforts still necessary, and thus constituting another period of the expulsive stage" (his fourth—the passage through the lower part of vagina and its external orifice).

Although in fact it is the plane of the bony arch where the true conflict is, and the passage of which constitutes the fourth period of the second stage, as modified from Hodge. When rotation is complete—*i. e.*, when the head has passed the middle strait, the perineum begins at first in its posterior portion to be put uniformly on the stretch. As the head descends in the axis of the middle strait, and the process of extension out under the arch begins, owing to the combined action of the uterine forces, the opposing coccyx, subpubic ligament, and the resilient perineal structures, the head emerges from the bones in the axis of the plane of the arch. It is when the occipital plane of the head comes into complete synclitism with the plane of the arch that the distention of the perineum is at its maximum, and consequently the period of greatest danger to the soft parts.

We would, therefore, instead of Hodge's five periods of the second stage of labor, make six, as follows:

1. Embracing the passage of the head through the superior strait and os uteri.

2. The descent through the canal of the pelvis to the plane of rotation.

3. The passage of the plane of rotation.

4. Through the plane of the arch.

5. Through the os vaginæ.

6. The delivery of the body of the child in cephalic presentations, or of the head in pelvic presentations.

We have the following divisions of the planes:

Historical.

1. Plane of superior strait.
2. Plane of inferior strait.
3. Plane of arch.

Anatomical.

1. Plane of superior strait.
2. Plane of middle strait.
3. Plane of anterior strait.

Physiological.

1. Plane of entrance and dilated os uteri.
2. Plane of rotation and extended coccyx.
3. Plane of exit and dilated perineum.

2. It accentuates the marked difference between anterior and posterior positions of the head, and demonstrates clearly the difficulty, if not absolute impossibility, of delivering *many* occipito-posterior positions in a state of perfect synclitism with the true plane of exit, the plane of the arch.

3. It renders easier the explanation of the effect on different cases of labor of a broad or narrow arch, of a deep or shallow one, of a high or low coccyx, and of a variation in the normal angular relations of these two straits.

4. It necessitates for the easy application of the forceps to the sides of the head and at the superior strait that the axis of the handles and the axis of the blades should make with each other an angle of 130°, corresponding to the decussating angle of the axes of two of these planes.

5. It places upon a scientific basis the theory of perineal support.

These doctrines, which are a logical extension of the teachings of Hodge, were developed and taught by my father, Professor William P. Seymour, at Albany Medical College, between 1870 and 1875, but otherwise never published, save in a letter in 1876 to Dr. Ellwood Wilson, his former colleague in the Obstetric Institute of Philadelphia. If my paper will serve a little to recall our American teachers from their provincial neglect of Hodge, the greatest of obstetric teachers, and the only one living or dead interpreting correctly the mechanism of labor, and lead them from the worship and teaching of foreign and infinitely inferior authorities in respect to the mechanism, I will be more than repaid, and if the American teachers should teach Hodge, American obstetrics will take the place where it ought now to be, as it was forty years ago, at the front.

HOW THE REFINEMENTS OF ABDOMINAL SURGERY HAVE INFLUENCED GENERAL SURGERY.

By DAVID BARROW, M.D.,
LEXINGTON, KENTUCKY.

That the refinements of abdominal surgery have been the principal factor in the wonderful results attained in this special work is certain; and that the successes in the abdominal cavity have made the general surgeon bold and have caused him to enter new fields and apply the truths learned in the abdomen to varied traumatisms, is equally well known.

To the small and rapid incision, minimum manipulation, thorough enucleation, careful irrigation, religious, cleanliness, and perfect drainage, is due the present advanced position of abdominal surgery.

At first the surgery of the abdomen was confined mainly to the uterus and its appendages, but as successes were gained, one viscus after the other came within the operator's reach, until now, all of the viscera covered with that "sacred" membrane, the peritoneum, are subjected to the surgeon's knife for the relief of disease or repair of traumatism. The liver, gall and urinary bladders, kidneys, spleen, pancreas, stomach, and intestines, are all subject to surgical interference, and from a long array of heretofore fatal diseases and injuries, we confidently expect many favorable terminations. From such achievements in the abdominal cavity, soon was created the desire to enter and relieve from disease the other cavities, and it was but a short time until the cranial, thoracic, and pelvic cavities were being daily manipulated by the surgeon.

Abdominal surgery, without its present refinements, would never have gained such a victory, and would never have stimulated the surgeon to perfect the abdominal field or to seek new ones.

In the early ovariotomies the mortality was great. McDowell lost 5 of his 13 cases; Wells 34 of his first 100; Tait 19 out of 50; Atlee, Keith, Schröder, Bantock, Thornton, Martin, and others also, were comparatively unsuccessful at first. But as experience was gained and refinements in details and manipulations were introduced, the mortality lessened, and we have results comparing favorably at the present time with most of the capital operations.

Of all the valuable lessons taught the general surgeon the first and most important is cleanliness; every preparation and all manipulations must be conscientiously clean. Unless the surgeon himself be clean; unless the proper care of instruments and sponges be taken; no surgeon, no matter how well he can cut and manipulate, will ever be successful in abdominal, or any other surgery. The leading abdominal surgeons have demonstrated conclusively that asepsis—I use the word in its broadest sense—can be practically attained, that it is best attained, not by the use of chemical agents, but by clean water and clean soap, and the faithful application of them to the surgeon and to everything that comes in contact with the patient, and by the application of a high degree of heat to all instruments used in the operation.

That cleanliness is godliness, is true in all surgical procedures: the man who wears a dirty shirt, who bathes but rarely, who lets the finger-nails grow long and serve as filth receptacles, who allows his instruments to rust and his sponges to hold sand and septic matter, cannot be designated a surgeon; nor should he be allowed to practise surgery, for so surely as he touches a wound, just so surely will it be contaminated.

Greig Smith, in his *Abdominal Surgery*, says: "I think there can be no doubt that the most important single contribution to abdominal surgery is the gospel of surgical cleanliness preached by Lister."

Dr. William Goodell, in his article in the *American System of Gynecology* on "Ovariotomy," says: "Time alone can demonstrate satisfactorily the relative values of Listerism and perfect cleanliness without Listerism." With him cleanliness is sought for and Listerism is used to that end.

In the discussion of a paper read by Dr. Joseph Price, at a

stated meeting of the Philadelphia County Medical Society, on "A Consideration of Some of the Recent Work in Abdominal Surgery," the subject of cleanliness was brought prominently to the front. All were impressed with its absolute necessity, but some approved and others disapproved of the use of chemical agents. Dr. John B. Roberts said: "So that infection be excluded, it makes no difference whether we exclude sepsis by chemical agents, by heat, or by absolute cleanliness," . . . . . "that the surgeon is bound to protect his patient by those means in which he has the greatest confidence against the risks of sepsis, and any operator who neglects this is guilty of a crime; and it is well to have that distinctly stated here, and in all medical societies, until the whole body of the profession realizes that it is a cardinal principle of surgery."

Dr. J. M. Baldy said: "Personally I never use chemical agents in my surgery, and I have the best results. There are a number of other gentlemen in this city who follow the same practice. I will pick five or six such men and compare their results with those of any other six operators in Philadelphia, and if our results do not equal or better those of our opponents, I will concede the point."

In the city I live in, Lexington, Ky., there were several gentlemen whose successes deserve mention and who were well known in Kentucky, and in one instance the reputation was national. Dr. B. W. Dudley was the most successful lithotomist of his day, and had, before the teachings of aseptic and antiseptic surgery, performed 207 lithotomies with only six deaths. Dr. Dudley knew nothing of bacteria or of Listerism, but he was clean in person and used clean water and soap unsparingly, and cleansed his instruments in boiling water.

Dr. J. M. Bush was a local celebrity; he was a man noted for his personal neatness and always attempted cleanliness at an operation. Dr. W. O. Sweeny, now living, but a retired practitioner, has delivered more than four hundred women, and never had one of them to die. He was scrupulously clean in all manipulations, used an abundance of water and soap, and watched carefully his hands and finger-nails.

Mr. Tait, the greatest abdominal surgeon, and the father of most of the refinements of abdominal surgery, has attained

wonderful results; the reduction of his mortality to 5.3 per cent. in his second thousand cases of abdominal operations, is due mainly to his manipulative skill and faithful attention to details and cleanliness. Mr. Tait, however, disregards asepticism, for he uses "water fresh from the tap," which probably contains poisonous germs, and to follow this part of his procedure in general surgery would, I believe, be harmful. The peritoneum is rich in lymphatics and capillaries, and Mr. Tait increases their absorptive power by depleting them by the use of saline cathartics; so by the absorption of the nutritive medium from the abdominal cavity, the germs are eliminated, or die, and can produce no disturbance. Therefore, it is due to the anatomical peculiarity of the abdominal cavity and the rapid absorptive power of the vessels there distributed, that we can disregard the admission of germs to the cavity without injury to the patient; but to admit pathogenic germs, for instance, to the knee-joint during an operation, would probably be followed by disastrous consequences.

Abdominal surgery has created a surgery of details; it has pointed out and emphasized the utter impossibility of a dirty and careless man ever becoming a successful surgeon; it has demonstrated that clean surgery can be done without the use of chemical agents, and that it is best to exclude all septic matter from a wound, rather than attempt its destruction in the wound. That the use of antiseptic solutions will do harm in general surgery, I do not believe for a moment, provided such solutions are used simply as additional safeguards against septic infection, and not to the exclusion of other aseptic methods.

It has been my observation that the general surgeon will usually wash his hands carelessly in either a carbolic or bichloride solution; he will pay little or no attention to his finger-nails; will dip his instruments in the antiseptic solution, and probably place them, after he has done so, in a poorly cleaned receptacle; the sponges will be fresh from the drug store and will contain quantities of sand; he will handle the patient, bed clothes, and probably different articles of furniture, after his hands have been cleansed for the operation; and, strange to say, he will feel, if he has succeeded in getting nice

flaps or has coapted the cut surfaces in a manner pleasing to the eye, that he has done his duty, and will probably apply his anathemas against antiseptic surgery when septicemia and pus make their appearance.

This is not an exaggerated picture; it is a true and candid statement of the facts as they usually exist, especially away from medical centres.

Abdominal surgery has told us in the most convincing manner, by its undreamed-of successes, that we must be clean and use clean appliances, and not feel safe in the attempt, always unsuccessful, to smother infection by chemical agents.

After cleanliness the next procedure in importance is probably drainage. I heard one of our leading abdominal surgeons, a short time ago, state that if an operator would inform him as to how he used the drainage-tube in abdominal surgery, he would tell him, within an approximate degree, his mortality. This operator uses the drainage-tube more generally than is usually done, and as his experience has increased, so has the use of the drainage-tube become more frequent.

Any fluid left in a recent wound is liable to undergo septic change, no matter whether it be serous or bloody, and no matter whether the fluid be in the abdominal cavity or confined between the flaps of an amputated leg. The abdominal surgeon has certainly impressed upon us, in a most convincing manner, the importance of this refinement; and allowing for the anatomical and functional differences between the abdominal cavity and the other regions of the body, the same rules and procedures will apply equally to drainage.

Dr. Joseph Price, in a paper read before this Association at its last meeting, on "Drainage in Abdominal Surgery," said:

"I have thus briefly set forth my ideas of the use of the drainage-tube, which, epitomized, may be stated as a surgical procedure which, without danger, eliminates to a great extent the danger of abdominal surgery—infection through the peritoneum. I believe the dangers referred to in connection with the tube are chiefly theoretical, and, for the most part, imaginary; and, when they are real, that they can be obviated and minimized to an extent which renders them of trivial importance compared with the risk that is run with the omission, or infrequent use of the tube in pelvic surgery."

In my own abdominal operations I have several times dispensed with the drainage-tube, when I now feel convinced

that it was needed and should have been used, and its omission was always followed by disastrous consequences.

Acting the part of the "sentinel" is another valued function of the drainage-tube, and that the information gained by it has enabled the surgeon to reopen a wound and stop hemorrhage that otherwise would have terminated fatally, we positively know.

In brain surgery the drainage-tube is essential, and that abdominal drainage has stimulated its use here I feel sure; and we often see a clogging or displacement of the tube followed by paralysis and septic disturbance, which, without prompt interference, will pass on to coma and death.

In general surgery we should always, when possible, drain with gravity; the more direct the outlet for the wound accumulation, the better result will we have a right to expect. In this Association considerable discussion followed the reading of Dr. Price's paper, already referred to, and that of Dr. Clinton Cushing, on "A Contribution to the Study of Pelvic Abscess," relative to drainage through the abdominal incision, or through the vagina, as suggested by Martin. Drainage through the abdominal incision, when properly done, is not against gravity, as usually implied, for the tube is merely an opening through which we can pass the long nozzle of a syringe to Douglas's pouch, and suck up the fluid as it gravitates there; and as fast as the fluid accumulates it must be drawn off—if necessary, every half hour. In other words, the drainage-tube, practically speaking, is not the drain, but an opening through which the most dependent part of the cavity can be reached with the nozzle, and the fluid drained off as fast as it accumulates.

The drying effect of a drainage-tube is an element of importance in surgery, for, by keeping a cavity dry, the oozing hemorrhage that will take place from a denuded surface when bathed in a warm fluid, will stop.

Drainage in all surgery has been encouraged and perfected by the successful achievements of abdominal drainage, and the truism, to "drain when in doubt" in abdominal surgery should apply with equal force to all wounds.

Great irrigation with the minimum sponging must be mentioned as a refinement to which the general surgeon would do

well to pay more attention. The use of a large quantity of hot water will usually cleanse a wound, and will not iritate it; to cleanse by sponging will be hard to do, and then, if the wound be cleansed, it is apt to be irritated.

In a surgical procedure prolonged anesthesia will cause shock, and is sometimes the cause of death in a patient who might have recovered had the operation been done more rapidly. I know of nothing in surgery to impress the operator more forcibly with this truth than an abdominal operation; and he who tarries in his work here, no matter for what cause it may be, must expect to have disasters from the effect of the long anesthesia.

The peritoneal "toilet" must be thorough; the importance of washing out coagulated blood and débris, and having the cavity clean, cannot be overestimated. That the same care of toilet should be taken in the removal of a tumor or the amputation of a limb should be insisted upon, and the surgeon who will be painstaking and thorough in this respect will be fully rewarded by the favorable results obtained.

Before closing this paper, I must speak of the surgical habits engendered by abdominal surgery, for it is absolutely necessary that the successful abdominal surgeon be a cool man; that he be a rapid operator; that he be one that has confidence in his power to overcome complications and meet emergencies; and, above all, that he should depend upon no one save himself, and be able to conduct the operation with but little assistance from others. How difficult it is to get satisfactory assistance in the towns and country most of us have had cause to realize; even for one abdominal surgeon to assist another is, as a rule, unsatisfactory, unless the two have before been in cases together and the one understands the manipulative procedure of the other.

Mr. Tait, in his abdominal operations, literally does everything himself, and the assistant is practically a figure-head; the greatest service he renders is in being not officious in handling instruments or otherwise, and in not putting his fingers where they will do harm.

To minimize this risk in surgery, an operator must have as few instruments as possible to do the operation satisfactorily,

and he must have them always so arranged in trays that he can pick them out himself and not trust another, and he must have a bowl of water convenient, that the instrument, before being returned by him to its place in the tray, can be dipped into this bowl.

The sponges will require the care of an assistant, either doctor or nurse; but, with this exception, it will be rare that an operation, either in the abdomen or elsewhere, cannot be completed by the operator alone; of course, an anesthetizer will be needed. The great aid that my abdominal operations have been to me in general surgery is my apology for bringing this paper before the Fellows of this Association, and, if not from the paper, I hope at least that from the discussion will come some expressions of opinion that will be of benefit to us all.

SOME ACCIDENTS AND COMPLICATIONS INCIDENT AND SUBSEQUENT TO ABDOMINAL AND PELVIC OPERATIONS.

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The time is come to acknowledge that the successes of abdominal and pelvic surgery are bounded and measured by the ability to master their complications. The field of gynecic surgery to-day is plowed and harrowed by as restless and motley a throng as ever surged upon the Pacific slope for gold. Too often their zeal is not for earnest work, but for local renown. They would build a tower to make themselves a name. The end must be confusion and complaint. These are troublous times for abdominal surgery and surgeons. They have their way to make and sustain both against the inherent difficulties of their work, and against the failures of those who insist on "opening the abdomen because it is easy." For this condition of matters abdominal surgeons are for the most part to blame, by reason of ill-advised expression as to the difficulty of the work. When Mr. Tait says in effect that the removal of the entire pregnant uterus is an easy matter that every country surgeon should be ready to perform, it is unnecessary further to explain this point. It is easy with special training in the technique of abdominal surgery, but most difficult without this. So it is in all the varieties of pelvic and abdominal work. The removal of an organ is often the least part of the operation. The attention to the minute details that alone can bring success to the operation is only attained by long and careful training. It has been asserted that the operation is nothing, that the after-treatment is the most important consideration. My own experience is diametrically opposed to this assertion. Prolonged treatment after abdominal section should be just or

almost as rare as repeated operation upon the same patient. In a majority of instances, the man who operates two or three times upon the same patient for the same or allied affection, has operated carelessly or inefficiently at first, and will probably do the same at last. This is the man who will find prolonged after-treatment necessary, and who probably considers the operation itself of secondary importance. Let us start, then, with the idea that the operation is a serious undertaking, to be seriously performed, after serious consideration; we are to remember, at the same time, that what appears the simplest may eventuate in the most complicated condition, and that herein the necessity for careful preparation in all that belongs to abdominal or pelvic surgery is the *sine qua non* of assured success. A knowledge of what may happen is the best protection against misfortune, and a chief factor of the extreme simplicity in the work of the best surgeons.

The accidents and complications must, of course, vary according to the organ dealt with or the nature of the operation. In the presence of adhesions we may have hemorrhage or intestinal rupture. These are most apt to occur in long-standing pelvic inflammations, and in extra-uterine pregnancy. Case XXVI. of my series well illustrates both these complications. Extra-uterine pregnancy with pyosalpinx produced a complication as hard to describe as to recognize. The intestine was torn off too low to bring the ends out for artificial anus, while the hemorrhage was such that the pelvis was packed to control it. The packing remained for sixty hours, when it was removed without return of the bleeding. The intestine was carefully sutured deep down in the pelvis, and, strangely enough, in the face of the extreme difficulty of this procedure, the woman recovered without fecal or other fistula. The case brings out the necessity of exact knowledge of intestinal suturing, and the importance of packing in pelvic hemorrhage. Half-way measures in these and similar cases must always result disastrously. In gonorrheal disease of the tubes and ovaries, where the disease is of long standing, there is frequently found such a degeneration of the tissues that it is impossible to make an ideal stump or button for safe tying. Luckily here, as in other degenerations, the bloodvessels are the last to yield their integrity; and when they are intact, though the stump is not ideal, the hemorrhage can be controlled. Case XXII. is a typical illustration of this condition in its extremity. The tissues

were so rotten that the ligature cut through broad ligament, vessels, and all. The cornu of the uterus was curetted, and the ligature applied directly to the uterine tissue. The degeneration of tissues, such as is here referred to, is not uncommon in all cases of pyosalpinx, whatever their origin. The importance of curetting away the diseased parts cannot be too strongly urged as the most important step outside the line of ordinary procedure. A complication of pelvic surgery, always vanquishing the neophyte and taxing the ingennity of the experienced, is the tying off of rudimentary appendages (Cases XXIV. and XXVII.) at the bottom of the pelvis. Nothing is easier than to tie off the normally developed tube and ovary; but when these lie at the bottom of the pelvis, almost entirely bound down in its peritoneum, to tie them off—done, as it must be, by the ends of the fingers, through an incision two inches long—requires an amount of manual dexterity only attained by much and patient endeavor. Now, as the application of the ligature may greatly complicate and delay the operation, so slipping may give rise to greater trouble. After careful tying, the greatest safeguard against slipping is the leaving of a generous button. There is no necessity for complicated knots with fancy names. The ordinary surgeon's knot, applied as it should be, will never fail to hold.

The more deliberately the tying is done, thereby affording brief time for shrinkage, the less likely is oozing to occur. The smoother the ligature, the better it will tie. For this reason I prefer cabled to braided silk.

In deep pelvic surgery there is constant danger of wounding the ureters. This, in the present status of our knowledge, involves a most serious procedure—the removal of the corresponding kidney. There is open here a wide field for vivisection experiment, to ascertain with what anatomical and physiological success the ureters can be grafted into the intestine. If this can be successfully done in the human subject, another important stride in surgery will have been taken.

The presence of dense adhesions, especially visceral, and the consequent hemorrhage, for a long time baffled the best attempts of the surgeon. Clots and débris of every description found their way and remained in every nook and cranny of the peritoneal cavity, from diaphragm to pelvic floor. These could not fail to do infinite harm, and the drainage tube was entirely inadequate to

remove them. This is, indeed, no easy task. As ordinarily attempted with the syringe, it is often unsuccessful, because the current of water is not strong enough to find egress with sufficient momentum to bring away the particles—often, indeed, masses—of lymph and clot. At the present, the gravity tube gives the best method of thorough cleansing. The water is poured into a funnel elevated according to the effect desired, while the other end fitted with a nozzle is directed all over the peritoneal cavity, under the broad ligaments, mesentery, liver, spleen, and, in fact, everywhere that clot can lurk. The free drenching or flooding of the abdominal cavity need not be feared; the heat is an important desideratum in relieving shock. I have constantly employed it, even where drainage was afterward found unnecessary, and have yet to find a single bad result. This has also been the experience of my friends operating more frequently than myself. Operation with existing pregnancy is a complication not much referred to. It is, no doubt, frequently met, and just as frequently concealed. In one such case I have operated to save life. The woman did not think herself pregnant, was suffering from peritonitis, belly tympanitic and tender, had high fever, and I felt, as I delayed operation a day or two while I tried without success to relieve her with salines and external applications, that I was treading upon dangerous ground. Operation revealed general pelvic peritonitis with pus in the tubes. The uterus was enlarged, which previously was in doubt, owing to the size and distention of her belly. Three days later the patient miscarried, her pain, in the meanwhile, being controlled with morphia and atropia. She recovered, and is now among the best of my results. It is evident that in cases such as this the tying of the ligatures is an important consideration, owing to the increased strain put upon them, both by uterine contraction and abdominal tension. I believe in these cases morphia or other anodyne is of distinct advantage. Here I met also another complication. The unrest of the patient, before I put her under anodynes, was so great and violent that the drainage tube was displaced. I felt there was need of it, owing to the extreme inflammation, and tried to reintroduce it. In this I failed, and had to remove it. For a day or two the symptoms were urgent, and I made preparation to reopen and drain, but, happily, under free

purgation, she became comfortable, and this was unnecessary. This was Case XIV.

The careful disinfection of suspicious tubes, before the stumps are allowed to drop, is a step, I am convinced, should never be omitted. I believe that failure to do this in one of my cases, apparently very simple, was the cause of peritonitis and death. A previously induced abortion, of which I was ignorant at the time, was, I believe, the immediate cause of the sepsis.

Among the immediate post-operative complications, peritonitis was until lately reckoned as most likely and most fatal, excepting, perhaps, hemorrhage. This is, in great measure, no longer true. Peritonitis must be distinguished from simple serous exudation. This latter is the result of simple oozing from wounded capillaries, broken-down adhesions, or even, perhaps, from the sometimes necessarily rough handling of the peritoneum. In the absence of specific cause, this, if drained away, does not cause peritonitis. Hence the philosophy of draining—both to remove possible pabulum for infection, and to take away the serum which hygroscopically attracts fluids by its presence. It is a physical law that moisture attracts moisture, and in the abdomen there is no exception to the rule. Where chemical antisepsis is used, there is greater liability to this serous exudation. There is thus also greater danger of post-operative visceral adhesions. This is illustrated in Case VIII. The patient had before been operated upon for uterine fibroid. A drainage tube was put under the care of her husband, and the abdominal cavity washed out with carbolic solution, of whose strength I am ignorant. When the abdomen was opened, the intestines were found matted together and out of all natural position. The transverse colon was adherent to the old incision. The remainder of the colon almost throughout its whole length was adherent to the other viscera. To free them, nearly all the intestines had to be handled. No other cause for this condition need be sought than the free use of carbolic acid.

That the saline or calomel treatment of serous exudation is of undoubted value after operation, does not admit of dispute. It is just as clear that it excels all other remedies. This is at least true so far as abdominal surgeons are concerned. It has now been so long insisted upon that it is an old story, and were it not that

general practitioners fail to appreciate its value for the most part, its mention here would be superfluous. Case XXIX. in my list is indisputable evidence of the value of this treatment. The condition of the woman was such that after all preparation for operation had been made, by the advice of Dr. Joseph Price, I postponed operative interference. The woman's pulse was thready and frequent, her belly tympanitic and tender, with every evidence of peritonitis. I at once put her on the mercurial treatment, administering a grain of calomel every hour, until twenty-four grains had been taken, stimulating her at the same time. The result was a complete subsidence of the acute symptoms and a vast improvement in the pulse-rate, and after a few days I operated. The peritonitis was general, and of a virulent type, the tubes being full of pus. After rather a tedious convalescence she recovered. Her only inconvenience now is a fistula, through which a ligature lately has escaped. This, I think, is owing more to her condition at the time of operation. Her bodily condition was such that none of the stitches held, the abdominal incision falling apart, and the entire wound had to heal by granulation. This brings us in sequence to the consideration of fistulæ. The drainage-tube is often charged with producing this complication. I can readily understand how this may be the case, especially in the causation of fecal fistula, where the tube is allowed for a long time to make harmful pressure upon the intestine. I believe, however, that in a great majority of cases the fistula has its origin in the ligature applied to the pedicle or in systemic vice. One of the most annoying fistulas I ever encountered, occurred in Case XXI., where no drainage-tube had been used at all. In the course of time it healed, and the incision is now perfect. In another case, just now closing, the operation was for the removal of the appendages, after a puerile attempt by another to hold the uterus in position by stitching it against the abdominal wall, while the ovaries were bound down by adhesions. The persistence of the fistula here, Case XXIII., may be due to incision through cicatricial tissue. I am certain I can give no other reason. For fecal fistula, except where the bowel is extensively injured or deeply torn without chance of suture, I think there is little excuse. Carelessness in examining the intestine after extensive breaking up of adhesions, or careless tying and omental inclusion, are perhaps generally at the bottom of the calamity. A tedious closing of an

incision I do not regard as a misfortune. It keeps the patient longer on her back, thus favoring more solid cicatrization and diminishing the chance of that other reproach of abdominal surgery—hernia. This accident I have never had to occur primarily. It exists in two of my cases, but it was present at the time of operation. In fact, in Case II., the operation was done to relieve strangulation, after the woman had vomited immense quantities of fecal matter. Her belly was and is enormous, and though she has never had trouble since her operation, a large hernia still exists. Certain it is that no drainage-tube was the cause in this case. In a discussion of this subject, Mr. Skene Keith some time since reported the accident's occurring in some cases, all of which had a short incision. He argued that apparently the short incision favors the complication, because of all the abdominal tensions being directed to a small, weak cicatrix. The fallacy lies in supposing that a long weak line, will be stronger than a short weak line, of incision. If the line is short, the mass of intestine able directly to impinge upon it, is correspondingly less. I cannot conceive that the law of hydrostatic pressure applies mathematically in the abdomen. My own experience contradicts this presumption, as does also that of many of my fellow-operators. From my own observation, I entirely believe in the correctness of Priec's view, that three causes contribute most hernias, to wit: Imperfect suturing, in which the abdominal tissues are not brought into proper juxtaposition; too early rising after operation; the too early abandonment of the abdominal supporter. To these may be added as a cause the very long incisions.

Reoperation brings with it its own peculiar complications. Usually these are in the form of adhesions. This has been the condition in three of my cases, XX., XXIV., and IX. In all of them adhesions were present between the intestines and the abdominal cicatrix. This evil is best avoided by a careful bringing down of the omentum, over the intestines and under the incision before closing it. This is a point too often neglected. A complication the cause of which is, for the most part, at the present only guessed at, and alike worrysome to both patient and surgeon, is post-operative hemorrhage. In most cases the patient, after the removal of the tubes and ovaries, is encouraged to believe that her hemorrhages, whether catamenial or otherwise, will cease. Everything goes on according to promise, until suddenly, from three to six months after the operation, hemor-

rhage suddenly occurs, to the fright of the patient and the disgust of the surgeon. This has happened in a number of my cases. The cause is still a matter of conjecture, hyperplasia of the intra-uterine mucosa being apparently a factor in most cases. Why this should supervene is not clear.

Curetting, hot douches, and iodine are efficacious in some cases, while in others the bleeding continues at various intervals. A rational explanation of this condition is much to be desired. Under this head I do not mean to include hemorrhage from malignant degeneration.

With this brief consideration of some of the difficulties of abdominal section, it would appear clear that operation is not a matter of routine, but rather of inspiration. Each separate case is a study of itself, and its complications a separate study. Successful operation means first a study of details, after this, careful observation and a gradual comprehension of principles. No operator of the present day has a right to start out with the mortality of ten years ago. No man has a right to record a death because he does not know how to tie a ligature. Operators are required, but only those are fitted to operate who are content to study principles and learn to apply details under efficient direction.

Appended is a table of all my cases to date, a study of the individual operations of which has afforded the subject-matter of this paper.

Examination of the figures shows that the drainage-tube was used in thirteen cases, or in about 40 per cent. of all operations. Had it been used in another case I believe I would have one fewer death to record. No hernias have occurred.[1] All but four of the patients operated upon are alive, two having died since operation. All the others save one or two are able to attend to their household duties. No patient is worse for her operation, unless I am ignorantly in error.

The number of deaths is two: one patient dying of sepsis the tenth day after the operation; the other never rallied, and died of shock. In the last twenty-eight operations one death occurred. In the last eighteen cases all recovered, and, with one exception, are doing their household duties.

[1] Since writing the above, the fistula in Case XXVI. has closed, but a small hernia has developed.

The complication that has been most annoying is post-operative menorrhagia.

No.	Date.	Disease.	Result.	Drainage.
1	July, 1886	Cirrhotic tubes and ovaries	Recovery.	
2	Sept. 4, 1887	Strangulated ventral hernia	"	
3	May 15, "	Suppurating appendix; hæmatoma	"	Yes.
4	May 21, 1888	Ovarian and tubal adhesions	"	
5	June 8, "	Septic salpingitis	Death.	No.
6	June 30, "	Double pyosalpinx	Recovery.	Yes.
7	July 22, "	General adhesions of tubes and ovaries	"	"
8	Aug. 3, "	Ovarian, tubal, abdominal, and pelvic adhesions	"	"
9	Aug. 14, "	Occluded tubes	"	
10	Aug. 16, "	Ovarian and tubal inflammation	"	
11	Sept. 23, "	Adherent tubes and ovaries	"	
12	Sept. 23, "	Double pyosalpinx	"	Yes.
13	Sept. 27, "	Papilloma; exploratory	"	"
14	Sept. 30, "	Pyosalpinx; pregnancy	"	"
15	Oct. 17, "	Double pyosalpinx; ovarian	Death.	"
16	Oct. 24, "	Omental hernia	Recovery.	
17	Oct. 25, "	Exploratory	"	
18	Nov. 5, "	Salpingitis and ovaritis	"	
19	Nov. 9, "	Ovarian cyst; salpingitis	"	
20	Nov. 25, "	Adhesions to old incision	"	
21	Dec. 8, "	Salpingitis; ovarian hypertrophy	"	
22	Dec. 18, "	Double pyosalpinx	"	Yes.
23	Feb. 17, 1889	Adhesions, salpingitis, ovaritis	"	"
24	Feb. 23, "	Dermoid, infantile uterus	"	
25	March 6, "	Cyst and salpingitis	"	
26	March 17, "	Extra-uterine pregnancy and pyosalpinx	"	Yes.
27	March 19, "	Ovaritis; adhesive rudimentary tubes and ovaries	"	
28	March 29, "	Chronic salpingitis	"	
29	April 5, "	Double pyosalpinx	"	Yes.
30	April 12, "	Dermoid cyst	"	"
31	April 19, "	Chronic salpingitis	"	
32	May 19, "	Ovarian cyst	"	
33	June 1, "	Chronic salpingitis	"	

DISCUSSION ON THE PAPERS OF DRS. BABROW AND HOFFMAN.

Dr. L. S. McMurtry, of Danville, Ky.—I am sure these very instructive papers just read will elicit most thorough discussion. There is one point in Dr. Barrow's paper which should be somewhat elaborated. I allude to his remarks upon the importance of curtailing as much as possible the time of operations, in view of the shock incident to prolonged anesthesia. This is a very important consideration, and

has received marked attention in the practise of those surgeons attaining the best results. Yet, in applying to general surgery this feature so prominent in abdominal surgery, there should be a clear distinction made between rapid work and hasty work. Conversation about the table should be dispensed with, and the attention of surgeon and assistants concentrated upon the work in hand. All possible complications should be considered; difficult and doubtful points decided promptly but thoughtfully; and action taken decisively, aiming at precision, but always being thorough, and, at the same time, avoiding dangerous haste. In this connection I wish to allude to the dangers that come from incomplete operations. Dr. Hoffman touched incidentally upon the fact that secondary operations are often the results of incomplete operations. The results of uncompleted operations are most disastrous. The class of cases justifying tentative and incomplete methods has steadily been lessened as the technique has improved, and as skill and courage on the part of operators have increased. And, as operative work is more thorough and complete, the mortality is assuredly lessened.

I was pleased at Dr. Hoffman's plea for simplicity in instruments and apparatus. In the first ovariotomy I ever witnessed I was impressed with the extent of the armamentarium. I had never before seen as many instruments collected for an operation. As knowledge has increased and skill has advanced in abdominal surgery, the technique has been simplified. Like all artistic work, with perfection comes simplicity. In regard to drainage, abdominal surgeons are very generally adopting the views so persistently advocated by Dr. Joseph Price, and the number of cases in which drainage is applicable is increasing. In one of my own cases where, being in doubt, I did not drain, I was compelled to reopen the abdomen three weeks after the first section. The patient made a good recovery, but the second operation would not have been required had a drainage-tube been inserted at the first.

Dr. A. Vander Veer, of Albany, N. Y.—Dr. Barrow's paper is one that emanates, beyond a doubt, from a mind that has been dwelling upon abdominal surgery until he has perfected himself in all the technique; but I take it that some of us who have been in the rough-and-tumble fight of general surgery for a number of years, and have gradually concentrated our time and labors upon abdominal surgery, will perhaps take a somewhat different view of a few of the points he presents. I remember the late Dr. Peaslee as a general practitioner and surgeon. I remember him as the neatest of all surgeons I ever saw operate. I believe that had some of us paid more attention to his

early introduction of drainage, we would have been very much better off regarding our statistics of abdominal surgery. When he finally confined himself entirely to the surgical diseases of women, he carried out this point of drainage in abdominal surgery in theory and practice ahead of his time, for he gathered many of his points from general surgery. I believe that abdominal surgery has done a great deal for general surgeons. Lister undoubtedly started in the right direction, but we cannot make use of Lister's spray and many other things he does while the work is going on. I look back with regret upon a case where I used the Lister method very carefully, but lost my patient—undoubtedly from carbolic acid poisoning. Dr. Barrow's views regarding drainage we must all agree with.

Dr. Hoffman has presented that kind of a paper, touching upon occasional cases and incidents in abdominal surgery, that is instructive to us. I believe that Mr. Tait's remark has been misinterpreted. I have looked over the *British Medical Journal*, but it is not to be found there—the remark that any country practitioner should be able to do the operation of removing the pregnant uterus.

Dr. Hoffman.—It is in the *New York Medical Journal*, over his own signature.

Dr. Vander Veer.—I do not believe that abdominal surgery can be done by every country practitioner. I do not believe there is any portion of the practise of surgery where experience is of so much service as in doing abdominal work. As Dr. Hoffman has touched upon the drainage-tube in one or two instances, I desire to speak of the use of the drainage-tube regarding the complication of resulting fistula. I do not think it responsible for it at all. I think we will find it occurs more often where the drainage-tube has not been used. I know the weight of testimony in my own mind is in this direction—that we occasionally get a fistulous opening where the drainage-tube has not been used at all. I have had one such case in my own practice. Regarding the use of the drainage-tube as Dr. Hoffman refers to it, it seems to me that the use of it in all cases where there is any complication at all is wise; that it really relieves us sometimes of the use of ligatures; and, again, we can use them with greater freedom when necessary. As to hernia, it is hard to account for it at all times. No doubt our patients get up too soon—this and a long incision tend to that condition. I have had two cases under my observation where hernia seemed due to these two factors—one where the nurse allowed the patient to get up too soon, and the other by taking off the bandage too early. Regarding hemorrhage after our operations, I have one

case that annoyed me very much, due to endometritis, which finally got well after a thorough curetting.

Dr. W. W. Potter, of Buffalo.—In discussing the two papers just read, the most I shall hope to do will be to emphasize some of the points made by the authors; for I confess that I feel like endorsing them substantially from beginning to end. While listening to them I was reminded of an expression which fell from the world's greatest captain, when he was writing his memoirs at St. Helena. Said Napoleon, "In war *men* are nothing; a *man* is everything." It seems to me that this aphorism will apply with great cogency to the subject which is now being discussed here.

In abdominal surgery it may well be said, "a *man* is everything;" his individuality, his personal courage, his amiability, his knowledge of his work, his ability to deal with complications, and his cleanliness, are all important elements in the character and person of the abdominal surgeon. While all would regret to see the late war reënacted, no doubt should that dire calamity befall us, though the surgery that was then done was better than any military surgery the world ever saw before, yet, in our present knowledge, it would be greatly improved upon, and many lives saved that were then lost. The surgery of the great cavities of the body has so improved—the cavities of the cranium, the thorax, and the abdomen—that it would result in a great saving of life; and, it must be confessed, the refinements of abdominal surgery have exerted a great and abiding influence upon all other surgery.

Dr. Hoffman has, among other things, alluded to the knot, which was a point that impressed me with considerable force. There is probably as much confusion among the average readers of the literature of abdominal surgery on the subject of knots, as upon any other one point. We are constantly asked, What is the Staffordshire knot? What of the Bantock knot, and various other knots that have taken the names of men or localities? How many here present can answer these questions clearly, or describe them with precision? I was pleased to hear Dr. Hoffman say that it did not matter greatly what kind of a knot was employed, or what its name, if it were only well tied, and, withal, tied in the right place.

Another point of great importance in this work is the question of irrigation. I have only lately made one of the most trying sections I ever had personal knowledge of, and I believe had I not been familiar with the potency of irrigation I should have lost my patient. She was literally dying of sepsis before the operation commenced, and was well-nigh collapsed before the abdomen was closed. It was a very dirty operation in every way, where more than a gallon of pus was drawn

from a dermoid cyst, where the adhesions were many and strong, and where considerable time was required to release them; but a continued flush of the hottest water that could possibly be borne—quarts of it poured into the abdomen—served to rally her before she was removed from the table, and she never had an unpleasant symptom afterward.

Where the gravity irrigator is not at hand, water poured from a pitcher will answer as a substitute; but this is not as efficient as the irrigator that I see lying on the table before me, and which Dr. Price will show. By this application of prolonged heat, we meet three important conditions: first, it closes the oozing vessels with which the adhesions frequently abound; second, it cleans out the abdomen of all clots and dirt; and third, it rallies the patient from shock. Probably no two additions to the armamentarium of the abdominal surgeon have contributed to save as many lives as the irrigator for the flushing of the abdomen after operations and the drainage-tube.

Passing over many of the points that were presented in the papers, or have been suggested in the discussion, I come now to the question of time. While it is eminently proper to minimize everything connected with abdominal operations, and especially to make them as short as is consistent with an intelligent dealing with any complications present, yet it is well to bear in mind the dictum of Sir Astley Cooper, that "An operation well done is done soon enough." A prominent operator, whom we all know, told me that not many weeks ago, while making a section, he was surrounded by fifteen or twenty very competent physicians, intelligent men from the surrounding neighborhood. The operation was a simple one; the cyst, a small one, came out easily and was tied off; when all at once he heard eight or ten watch-cases snap, which warned him that these men had been observing their watches rather than the operation. Further comment on this point is unnecessary; for the time has surely passed when the skill of an operator is to be judged as resting alone upon his ability to do an operation speedily.

Dr. Joseph Price, of Philadelphia.—Perhaps sufficient has been said, and quite sufficient in the papers, to cover the whole ground. I accept the papers—hook, line, and sinker. There are a few points I might, purely from a practical standpoint from my own experience in the pelvis and abdomen, talk about briefly. There was something said in the paper, and also by Dr. Vander Veer and others, about Lister's contribution to surgery. I have but little to say about it, as I have but little to thank Lister for. I think Dr. Vander Veer, Keith, and others have but little to thank Lister for. Surgeons worked away for some years with spray and carbolic acid, until they recognized that hundreds

— you may swell the numbers if you like—died from carbolic-poisoning. Many surgeons suffered from the carbolic acid. They ceased to use the acid because they themselves were crippled by it. I myself was at one time the victim of renal disturbance, not, however, in my own work; I never use it. It is not in my house, nor in the hospitals I am connected with. I should look upon it as I would upon a rabid dog.

Cleanliness.—Years ago, you remember, it was the practise to clean up yourself and your surgical case after examining a woman. It was not the practise to do so beforehand. You could throw off your pair of sealskin gloves you had worn for ten years, then examine the woman, and then wash your hands. Now it is a rule, before you touch your patient, to cleanse yourself thoroughly—as thoroughly as soap and water and brush will do it. Some take the precaution to use chemical solutions, so that they may have some irritant upon their hands.

I find the country practitioners rather broad and strong men; rather keen in diagnosis. They tell you what they have before you go, and you do what they call you to do. Dr. Barrow quotes from Dr. Goodell. While discussing the question of cleanliness, I would simply allude to the first edition of his book, wherein he gives a long list of necessary articles, comprising about half a column, to be procured by the family. In one list he gives "old sheets, old comforters, old pillows, and old carpets," and all the abominations from the cellar to the attic. Now in the last edition they are not to be found. Clean sheets and clean articles are to be provided by the family. I call attention to this to emphasize the importance of cleanliness. It is difficult to have a patient clean enough, and it is exceedingly difficult to have sufficiently clean nurses, that will keep their hands off chairs, door-knobs, and other articles of contamination. A surgeon doing an operation should control everything, from the door-knob to the incision. Dr. Potter has called our attention to the greatest of all soldiers, whether dead or living, and he had nobody about him but marshals. An abdominal surgeon should have nobody about him but marshals.

In regard to who should do the work, and where it should be done, Dr. Vander Veer has clearly indicated that a man should never begin the study and practise of surgery in the abdomen. An abdominal surgeon should have at his hand all surgical resources, and should have had thorough training in general and special surgery. The abdomen is not a skating-rink, a natatorium, or anything of that sort. The difficulty in the beginning was that plain obstetricians, even public vaccinators, commenced removing ovarian cysts without any knowledge of surgery whatever. Surely, those men began the study and practise of surgery in the abdomen, and you can pick them out by their mortalities. It

was not so with McDowell, Dunlap, or with the Atlees. They were all surgeons. The first operation done by Atlee, in 1843, has not been improved upon. It was the first pelvic operation I have any knowledge of, and was the most complete and ideal of any I know of. The surgeon succeeds in getting at a specimen by enucleation, the pathologist only by scissors and knife—difficulties and complications. The Atlee patient was placed on the table with a pulse of 104, without ether, and it was a general enucleation. He tied and dropped his stump, cleansed thoroughly and put his patient back to bed in thirty minutes, with a pulse of 100, four beats less a minute than before the operation, and no collapse.

A word in regard to ligature and tying: I feel that in the hands of men of little experience, this is an important question. Beginning with the Staffordshire knot, I believe it has done a great deal of harm. But few know how to tie it. I am satisfied that hemorrhage has been a cause of death in abdominal operations, where the Staffordshire knot has been responsible. I counsel that men without much experience use the figure-of-eight instead. Mr. Tait uses the Staffordshire, but I notice he uses two hemostatics to make a strong tie.

Drainage.—I agree with Dr. Vander Veer wholly as to the tube not being the cause of fecal fistula. It is rare for the tube to be in apposition with the sigmoid or a knuckle of the ileum. You may separate an adhesion on the cecum and break it through to the mucous coat, begin your enucleation and soon discover that you have a flap; and, if you reverse your enucleation, you will leave that flap on the bowel and can stitch it neatly down. You will frequently have a fecal fistula following angry pus operations. Often you have a history of fecal fistula before operating.

Ligatures applied in cheesy, disorganized tubes with unhealthy disorganized tissue, are in many cases bound to come away. They are in unhealthy tissues, and I do not see why you should look upon it as an accident while operating to save life. These operations are done to remove useless organs; organs not only useless, but far advanced in disease, killing the patient; purulent changes, pus-tubes, and abscesses. I rarely see anything else.

I do not believe a general hospital is the place in which to do abdominal surgery; I scarcely believe it the place to do any surgery. I look upon it as a great, big neglected water-closet; forty, sixty, and one hundred stools a day to contaminate the atmosphere of a ward. I could demonstrate, in the maternity hospital under my charge, the location of the water-closet by temperature charts. Before a circulating atmosphere was placed between the water-closets and the hospital,

it was common to have a temperature of 101°. After the closets were put out of the hospital, the temperatures fell to 98½° for the next forty or sixty patients. I am myself not much in favor of general hospitals.

Sequelæ.—Hernias and fistulas seem to puzzle many abdominal surgeons. I have seen but few cases of hernia. I know that it has occurred, and will continue to be a source of trouble. I think it is due largely to few stitches imperfectly applied; stitches that cut and strangulate; stitches that provoke stitch-hole abscesses. Erichsen says that a tight stitch has killed a patient. A great number of well-applied, not very tight stitches introduced with a small needle, not the big bayonet with the handle. Now that we are using a small needle, we seldom hear of tetanus. Years ago, Sir Spencer Wells and others had a good many cases while using the large needle.

Much has been said about adhesions. The adhesions in chronic and inflammatory troubles are usually well organized, and difficult to deal with. It is a matter of practise only, to familiarize yourself just how to shell out pus-tubes and abscesses of the ovary. Though many are prone to look upon these troubles as rare, they are really exceedingly common. There are even hundreds of patients in every city dying of pus to-day. A surgeon must have the abdominal instinct to save these patients. It is surprising the number of women dying of small cysts and from pus-tubes and ovarian abscesses, closely adherent to coils of intestine and important viscera. And some have carried the pus all the time from one month to thirteen years. Some are still living who had sponge tents introduced fifteen years ago, when the use of them was exceedingly common. Two weeks ago I incised a pus-sac, in Pottsville, and evacuated over a gallon of pus. Thirteen years ago a prominent Philadelphia teacher introduced a sponge-tent, and she remained in bed six months from an angry peritonitis. She has been an invalid ever since that time. She suffered along until three sinuses appeared about the sacrum. Eight years ago a prominent teacher in gynecology made vaginal drainage which relieved her temporarily, but it was not thorough. She suffered on until her bones were like knife-blades. Now she submits, after carrying pus thirteen years, to section and drainage; and, to my great surprise, is doing fairly well. Physician and patient both think she will get well. About drainage—I would stop pelvic surgery if there was legislation to prevent my using it. My ability to apply it is a constant stimulus to do pelvic surgery. Without it, the mortality would be too great for practise.

I herewith present a drainage-tube where the perforations are small. There is no need to use a large tube. A small tube will drain as freely

as a large one. The object in this work is to minimize every risk. I do not like hospital anesthesia; it should be as short as may be, and as little ether used as possible. It is well before you irrigate to suggest to your anesthetizer to crowd the ether a little.

If a large funnel with a gravity-tube is introduced, with two fingers in the upper angle of the incision and your fingers separated, you make a very nice trivalve speculum, and everything is flooded up nicely and rapidly. I have been in the habit of closing the abdomen full of water, in bad pus cases, chronic peritonitis, appendicitis, etc. Simpson prefers the dry treatment, without any irrigation, using sponges. I do not think it is possible to make a perfect toilet with sponges. Allusion has been made to Martin's drainage and results; I think it is high time American surgeons ceased following Martin's, or other German methods. We cannot afford to risk the lives of our patients by following the methods of a man who lost fourteen patients out of seventy cases. Surely, such an alarming mortality should stay a man's hands in all pelvic surgery. The mortality should not be greater than five per cent. in unselected cases.

The President.—About seventy years ago McDowell made the first ovariotomy. It is almost true to say that the operation for the time being died, after McDowell's time.

In the year 1843, in July, the operation referred to by Dr. Price was made by Atlee. Two months later, forty-six years ago yesterday, the first ovariotomy of the West, after McDowell's, was made by Dr. Alexander Dunlap, whom I now have the pleasure of introducing to the Association.

Dr. Alexander Dunlap, of Springfield, Ohio.—The last speaker stated that Atlee and Dunlap were surgeons before they attempted these operations. Gentlemen, I do not claim to have been a surgeon at all when I did my first ovariotomy. I was forced into it. But what I do claim for every one who is a good and successful surgeon is, that he has a gift from nature which he never would be able to learn; namely, that of keeping his mind perfectly steady in high periods of excitement. A man who cannot keep himself perfectly calm and his mind free from excitement, under all circumstances, is not a safe surgeon, no odds how well he may understand its principles or its practise. That is all I claim for myself at my first operation. I had done some surgical operations, and when I look around and see the heads of those men before me, there are very few of you that know personally what surgery was forty-six years ago. My friend, Dr. Tate, here at my right, in whose office I was a student, said to me once that if I happened in at the proper time, he would give me a case of obstetrics;

but I happened to be at lectures and did not get the case. I went home from medical college with my diploma, thoroughly satisfied that I knew nothing about medicine, excepting one thing, and that was, that I could cure fevers. Prof. John T. Harrison told us that if we had a case of fever to salivate it, and as soon as we saw signs of ptyalism, we could turn to the friends of the patient and say that "their loved one is saved." He repeated that over until I was thoroughly impressed that I understood it. My brother, with whom I was going into partnership, when I went home said to me, "Don't disturb me in obstetrics; I have learned enough to know that if you can make the community believe you can do any one thing well, they will take all the rest for granted. I advise you to take surgery." I told him I had never read a book clear through on surgery. "Well," he said, "you turn in and do surgery." He was afraid of that. I said to him, "If you will give me cases of fever I will attend to them, and I will make a living. There are lots of fevers around here, and Harrison tells me there is no use of their dying if we can salivate them." My brother said that fevers only came in the autumn, and I would starve the rest of the year. Said he: "Get something that is running the whole year round; if you do not like surgery take the diseases of women and children." I said that I knew as little about them as about surgery. After talking that way awhile, I told him I would think about it. He said, "If you take up anything, as your particular sphere of action, you must study it up and make a success of it, and then you can get credit for all the rest of your ignorance." This was in April, 1841, and the result was in the latter part of August for the first time I got to see a case of fever. It was the most terrific scourge of typhoid fever I ever knew in southern Ohio. I had two patients, and commenced to salivate them, and in a few days I wished to leave the State. I gave big doses and little doses, but there was no ptyalism, yet on the twenty-first day I thought the two young men to whom I had given that treatment were getting a little better and I could say to their friends that their loved ones were safe; but I could not see any salivation, and I could not understand why they were getting better. However, on the twenty-third day I was sure they were better, and on the twenty-fifth day I could smell the calomel. Then, for six weeks, I had a fearful time. The patients were getting well, but were cursing me for rotting out their mouths. These cases made me lose faith in my teaching of medicine, and if I ever knew anything about it I would have to learn it myself at the bedside of the patient. Two years after that I got hold of a case of ovarian tumor. I did not know what it was for a while. I had heard that McDowell had

operated, and in one little article in an old medical dictionary it stated that McDowell had done the operation, but it was now condemned, obsolete, and considered to be murderous. I happened to tell this to the patient when I was talking to her; nevertheless she insisted upon my operating. I debated with her until she was almost dead, but she said if I would not do it she would get a common butcher to cut it out. She said, "All I ask is, for you to cut me open and let me see what it is, and I will die happy." I did it the 17th of September, 1843, almost as perfectly as I could to-day.

My preparation for the operation was a careful study of the organs of the abdominal cavity, until I had them as plain to my mental vision as they would have been had the cavity been open to my eyes, and I said to myself I would not cut any of them out; but anything else that I found that ought not to be there I would cut out.

Fortunately, as soon as I opened the abdomen, I found what I thought ought not to be there. In running my hand around it I burst one big sac. I sponged out the abdomen and turned out the sac and there was a long pedicle. I could have almost shouted Glory! because I knew I could now control the hemorrhage. I finished the operation just as I do to-day. I pierced the pedicle and tied a double knot with silk; I always waxed the silk until I got it thoroughly imbued with wax. The woman lived nearly a month, and was out of all danger from the operation itself. I had been tapping her every ten days, for nearly six months, and drawing out a big wooden bucketful of water each time. The sudden checking of that flow of water from her system brought on a severe diarrhea, with large watery stools. I got that controlled, and she appeared to be doing well, when her kidneys began pouring out a flood of water and, as I could not stop that, she ran down and died.

I sent a report of the case to Prof. Harrison, and he returned it to me, saying he would not publish such an article, because it would only encourage some other man to do a foolish operation; and I tore it up—what would have been my first contribution to the literature of ovariotomy.

Since then I have done nearly four hundred laparatomies. The last was day before yesterday. The woman was doing well when I came away this morning. In my operations there has been a little over eighty-three per cent. of cured out of the whole number. Some were cases I would have preferred not to undertake. Some died from accidents that ought not to have happened. From the earliest point of my surgical practise my rule was perfect cleanliness, tying all the blood-vessels and controlling all the hemorrhage. The next six, after my

first ovariotomy, got perfectly well, and they were terrifically adherent. I then thought it was blood clots I had to fear, and that inflammation was the great secondary danger. I would roll the bowels and tumble them about until I was sure I had every particle of blood cleared away. I found the sponge was the best thing to get it out with. When I had the clots out I had all the serum out as well, but I did not then fear the serum. The ninth or tenth operation was the first one I found that was not adherent—a simple cyst with a long pedicle. I opened the cavity; took the cyst out; the assistants kept the wound closed around it; I tied the pedicle, and dropped it back into the cavity. The second day the girl did not look quite bright; the third day the bad symptoms increased, and at the end of the fourth day she was dead. I could not tell what was the matter, and yet I was satisfied I had killed that woman. I had not put a sponge into her abdomen; but I had left all the fluid in there. The moment that fluid comes in contact with the air, it changes its character, it dies; it becomes a foreign substance, and if dropped down into the cavity it kills all of the other fluid there. In such an imperfect operation I presume Dr. Price would advise drainage. I do not believe in drainage much, as I have never used it to any extent, and I have never put in a drainage-tube. I used to bring out the ligatures to facilitate drainage, but finally abandoned that.

My mode of operating is to cut a long incision, open the cavity, and get down and see what I am doing. I would not risk cutting a small opening into a woman's abdomen after my experience with that girl, and then tie a sponge on a little stick, and push it down into the cul-de-sac to get out the fluid. Sometimes one will bring out great clots of thick albuminous stuff, that could not discharge through a tube. The tube is necessary where the operation is not perfectly done. If you will do beforehand what is necessary to be done, you will not need the tube. I have sometimes cut off part of the ligature and left it in to keep the place open, so if there should be a great accumulation of serum I could get in a syringe and wash it out, but I have never had to do it. Put a cord in there, and the adhesions that form around it will render its removal difficult. My scepticism in regard to the drainage-tube is due, probably, to the fact that I have never used it, and I have been about as successful as most men who have performed the same number of operations, especially when I include this early period of darkness. I heard Lister when he came over to Washington, and wasted an hour in telling us how to use a spray. I told the man sitting by me, "That is all bosh; I have been through that carbolic acid craze and have killed one patient with it." The great sewerage system of the body is through

the kidneys. I say that any one of you here, sound and healthy as he may be to-day, whose kidneys stop carrying out the effete matter, in less than three days will be dead. You can live a great deal longer if your liver is inactive, but if your kidneys are inactive you will die quicker than if any other secretive organ in your body ceases to act. Your patient is in a bad condition when the kidneys begin to go wrong. They are the most efficient drainage-tubes you have.

Dr. Rufus B. Hall, of Cincinnati.—I approve the sentiment advocated in the papers read before the Association this morning; there are one or two points, however, that I believe ought not to be passed without comment.

I desire, first, to add my approval to the use of the drainage-tube. I am confident that in pelvic surgery, particularly in that class mentioned by Dr. Price in his discussion as filthy or dirty operations, we could not have the low mortality following them that we do at present, if we dispense with the drainage-tube. In fact, in all the operations in which the adhesions are firm and extensive, with pus in the tubes or the ovaries, I follow the method of practise so thoroughly advocated by a number of the speakers this morning. I put in a drainage-tube in all doubtful cases, and for the last three years in all cases not doubtful as well. I have had, indeed, but one operation in four years in which I did not put in a drainage-tube. In a few, I will confess, the drainage-tube was not necessary, but it was removed in a few hours—which can always be done if the tube is not needed—without any resulting harm. The one case in which I did not use the drainage-tube because I did not think it necessary, figures in my death-list.

The second point I specially desire to speak of was brought out in one paper in which the author dwelt upon the after-treatment. Dr. Hoffman, I infer from the words used, does not lay much stress on the treatment subsequent to the operation. He said that prolonged after-treatment is not necessary. I will admit that prolonged after-treatment is not necessary in the cases to which he referred. They do not usually require very careful attention for a long period of time; but, in all desperate cases, it is essential to have careful treatment the first three or four days. I never feel perfectly safe until after the fourth night has passed. Take a case requiring a drainage-tube: it may go on all right, and again it may not. Suppose you trust it to an assistant or nurse, or any one of you operates at a distance and the drainage-tube is not looked after as it should be, the patient will probably die; that very case, under the care of the operator, where he can see her as often as necessary, will probably get well. I advocate the practise of supervising the after-treatment in person in such cases.

Speaking of the time consumed in the operation, while I fully appreciate the propriety of a short operation for the patient, I do not think that in this, any more than in any other operation, a man should operate against time. The work should be done, and thoroughly done, if it takes nine minutes or ninety minutes. I have seen the same ovariotomist make one operation in nine minutes, and the next day take ninety minutes; and his work in either case was beyond criticism on that point.

In regard to flushing the abdomen, flushing it through a gravity-tube is much superior to turning in water from a pitcher. The end of the irrigator should be passed down as far into the bottom of the pelvis as possible.

Dr. Dunlap.—The first paper read told about hernias following the operation. Most operators have laid it to the stitches or to the drainage-tube. Dr. Price also alluded to the kind of needles. I take a big needle, a long one, so that I can pass it down through the edge of the abdominal wall until I get the edge of the peritoneum inclosed, and then carry it through on the other side, including the other edge of the peritoneum with one passage of the needle. It takes a good-sized, long needle to do that, and I am careful in tying to bring the parts in perfect coaptation. I put sutures in about one and a half inches apart; intervening I put the isinglass plaster, and at the end of three days I always take the stitches out, and the union is perfect. The stitches do no good after that, and there is danger of abscess if they are longer left *in situ*. I expect the abdominal opening to be closed at least on the fourth day. The cut surfaces will remain united, and there is no danger of their bursting asunder if you have the bandage well adapted. As soon as the patient sits up, I have a solid body-corset fitted and snugly laced over the abdomen with a small compress under it, and I tell the patient she will have hernia if she takes it off; but, if she will wear it for a year, she will never have any hernia.

Dr. Wathen.—What per cent. of hernia do you have?

Dr. Dunlap.—I never have had any when these directions were followed, and but two where they were neglected.

Dr. Wathen.—Have you ever had any tetanus?

Dr. Dunlap.—No; I never had any tetanus.

Dr. Wathen.—I desire to call attention to Dr. Price's assertion yesterday and to-day, that the use of large needles in abdominal and perineal operations caused tetanus. I am not able to appreciate the force of his argument, nor have I seen statistics to justify it; and I do not believe they can be found. We have had tetanus where small needles were used. Some of you will remember the report by Dr. Taber John-

son, at the Newport meeting of the American Medical Association, of a number of cases in which tetanus followed abdominal section in his practise and in the practise of other operators. These gentlemen used just such needles as Dr. Price and most abdominal surgeons use to-day. I am unable to find any evidence to justify the assertion that large needles used to close the abdominal or perincal operations play any part in causing tetanus.

Dr. Price.—In the statistics given by Dr. Johnson, but one case was done recently.

Dr. Seymour.—I would like to suggest that perhaps tetanus in the early cases was due to the clamp.

Dr. Price.—I would like to ask Dr. Dunlap a question regarding the use of the clamp. Dr. Dunlap commenced ovariotomies correctly. His series—eight—was the longest then ever completed without a death. No operator has even since *commenced* with eight operations without a death. It is the most perfect series on record. I want to ask Dr. Dunlap the question, Where and when, if ever, he adopted this clamp?

Dr. Dunlap.—Never.

Dr. Hoffman (closing the discussion).—I feel very much ashamed of myself that I came here not knowing of Dr. Dunlap's remarkable record. I must confess that standing up before his great experience and wonderful success, I feel very much like the child reaching out for something beyond him. I do not know, veritably "desiring without hope," that I will ever live to do the work that he has done. If I do, I am sure I will never deserve so much credit for it. If the calumny, and slander, and all that was heaped upon a character so courageous as this man standing before us to-day, cannot teach us, more than anything else, charity to honest and earnest work and fraternal sympathy, we had better all go from here to-day mute and ashamed, and drop out from the ranks of those worthy to follow such as he.

A STUDY OF THE PATHOLOGY AND TREATMENT OF INTRA-PELVIC INFLAMMATIONS.

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Intra-pelvic inflammations, with their sequelæ, comprise the most common conditions with which the gynecologist has to deal. In the entire compass of medical science and practise no subject has been more misunderstood and none more erroneously interpreted.

Thirty years ago Bernutz and Goupil, after careful clinical and post-mortem investigations, clearly described the true pathology of pelvic inflammations, but it has only been since operative surgery has opened up the peritoneal cavity to daily exploration that their researches have been appreciated and accepted. Even at this advanced period, many of our prominent teachers and authors classify intra-pelvic inflammations under two heads—*parametritis* and *perimetritis*—with treatment adapted accordingly. Modern investigation has swept this classification aside, confirmed the truth and accuracy of Bernutz's researches, and demonstrated the relation of diseased states of the ovaries and Fallopian tubes, together with puerperal, specific, and other infections, to pelvic inflammations.

It is not my purpose to review before this audience the anatomical relations and histology of the pelvic organs, a task altogether superflous; nor will I, except in the most casual way, touch upon the vast literature of pelvic inflammations. It seems to me most profitable at this time to treat the subject from the pathological and clinical standpoint.

M. Bernutz made a most happy comparison between inflammation within the pelvis, and the same process within the chest. Skene and other modern writers have utilized the same analogy to describe and illustrate the pathology of intra-pelvic inflammation. In both thoracic and pelvic inflammation we have the croupous and catarrhal

processes. We have peritonitis and parenchymatous inflammation on the one hand, while we find pleuritis and parenchymatous inflammation on the other. In pelvic inflammations we have recovery by resolution just as in pleuro-pneumonia, leaving adhesions and bands in the one cavity as in the other. When the inflammatory process so interferes with nutrition as to destroy vitality, we have pelvic abscess in the one site and pyothorax in the other. We find the bacilli of tubercle invading the pelvic serous membrane and contained organs, just as in the pleura and lungs. A mucous surface furnishes access for infection in both cavities. M. Bernutz further states that uterine pathology is as certainly subordinate to a thorough acquaintance with pelvic peritonitis, as pulmonary diseases have been to a complete knowledge of pleuritis made possible by the discovery of auscultation. In the light of knowledge recently established this last statement shows how thorough and profound were the researches of these eminent clinicians and pathologists, MM. Bernutz and Goupil.

Permit me to continue in the lines indicated by Bernutz once again. After discussing the theory of pelvic inflammation promulgated by M. Nonat—essentially that of pelvic cellulitis, which until recently held full sway in the practise of modern gynecology—he says:

"For some time I had no idea that the view propounded by M. Nonat was a mere hypothesis which rested on no post-mortem evidence. And it was not till after the unfortunately fatal termination of two cases, that I was able to prove incontestably that the peri-uterine tumor, which during life presented all the symptoms of the so-called peri-uterine phlegmons, was not situated in the cellular tissue at all. In the autopsies in question, the tumor, which even after death presented all the usual signs, was seen to be formed by the pelvic viscera being matted by peritoneal adhesion. . . . . These researches, then, have led to the conclusion that inflammation of the pelvic peritoneum, which is the cause of the visceral adhesion, is a disease which is very commonly met with. . . . . Lastly, I conclude that inflammation of the pelvic serous membrane is symptomatic, and that it is generally symptomatic of inflammation of the ovaries or Fallopian tubes. Thus, great interest attaches to the study of this affection, and it is very important to understand thoroughly the symptoms, in order to describe satisfactorily the uterine, and more especially the tubo-ovarian, diseases which occasion it. . . . . It follows from all this that unless we get fatal cases to enable us to determine anatomically where the pelvic inflammation began, we cannot state positively whether it came from inflammation of the ovary or of the Fallopian tube; nor whether it was caused by the puerperal state, by blenorrhagia, scrofula,

or any other malady. Thus we can only lay hold, as it were, of the two ends of the pathological problem, the primary disease and the serous inflammation—the intermediate gap we can only fill up after death."[1]

Herein may be found the very essence of the most advanced pathological knowledge of the day concerning intra-pelvic inflammations, and it is surpassing strange that the researches of MM. Bernutz and Goupil lay before the profession for so many years like good seed upon sterile ground. It was only when the science and art of surgery made great strides forward, as illustrated in the perfected aseptic surgery of the day, that "the intermediate gap" which Bernutz could "only fill up after death" was filled up during the life of the patient. The researches of Bernutz and Goupil in this important field of pathology are complete, and constitute the basis of the pelvic surgery of the present time; their work is the first and the greatest—a monument to the genius and patient industry of these faithful followers of science.

The points relating to the pathology of pelvic inflammations which have been established, the correctness of which I am fully convinced by my own clinical observations and experience, may be grouped in this manner:

1. Intra-pelvic inflammations cannot be properly classified as parametritis and perimetritis, inasmuch as inflammations of serous and cellular tissues cannot be separated clinically or histologically.

2. Peri-uterine phlegmon of Nonat (pelvic cellulitis of Emmet) is as rare as inflammation of the cellular tissue in other parts of the body.

3. Intra-pelvic inflammation is, as a rule, *peritonitis*, resulting from disease of the ovaries and Fallopian tubes, arising in puerperal or gonorrhœal infection, or the miscellaneous infections carried to the endometrium by unclean instruments, tents, or medicinal agents, or from traumatism.

4. Pelvic peritonitis is symptomatic, never idiopathic. Pelvic peritonitis presents every grade of severity. In some instances there is a mere inflammatory spot, giving rise to but little discomfort at the time and passing away without treatment, leaving a bare trace behind, often found post-mortem. A higher grade is illustrated by those instances wherein the peritoneum exhibits sub-serous

[1] Clinical Memoirs on the Diseases of Women. New Sydenham Society, London, 1867. Vol. ii. p. 5.

congestion, transudation of serum, and exudation of plastic material. In a more severe grade there is immense transudation of serum, which accumulates in the pouch of Douglas, corresponding to pleurisy with effusion. In a very high grade the entire pelvic peritoneum is involved, the several stages of the process—congestion and exudation—are followed by suppuration, an affection of fearful proportions, and, unless treated surgically, going often to a fatal issue. The sequelæ of pelvic peritonitis depend upon the vitality of the individual, the grade of the inflammatory process, and the area involved. Where the surface is limited, or may be quite extensive, recovery may take place by resolution and leave only slight adhesions behind. When the inflammation is higher and the exudate more extensive, layers and bands of false membrane remain, forming organized adhesions. The products of inflammation may be deposited over the uterus, ovaries, and broad ligaments, leaving these organs imbedded or entangled in a mass of adhesions. As time goes on, the exudate passes through repeated stages of congestion into organized tissue with constant tendency to contraction. Pressure upon the ovaries is followed by inflammation, degeneration, and atrophy of these organs. The fimbriated extremities of the Fallopian tubes are imprisoned and destroyed. At each recurring menstrual flux, these bands are made tense by congestion, increased in thickness, and more thoroughly organized. In addition to the lesions entailed by pressure, the secretions are retained, and ovarian abscess and pyosalpinx are common results. When the inflammation is very intense, involving sub-serous structures, the vitality of tissues is destroyed, and one form of pelvic abscess is the result.

Although it is not contemplated to discuss the diagnosis and symptomatology of intra-pelvic inflammation in this paper, I must be permitted to dwell for a moment upon the clinical picture which corresponds to the lesions I have just described. A woman suffers an attack of gonorrhea, often contracted innocently, and has a severe attack of pelvic peritonitis; or she has an abortion, or labor at full term, and has the misfortune to become infected and peritonitis results. After a severe and protracted illness, the acute symptoms pass away; in time, she gets up and is congratulated by her friends upon her convalescence and recovery from so severe an illness. Time wears on with improvement in her general condition, but she maintains that she is not well. The menstrual periods are

seasons of intense pain and distress, and usually opium is administered. By and by, the family physician makes an examination, and my observation has been that he usually decides a malposition of the uterus to be the principal trouble, and inserts a pessary. The trouble persists, and pain is intensified by the pessary, which after a varying period has to be abandoned. The woman is an invalid. If well-to-do, she spends the greater portion of her time in bed, drives out occasionally, and craves morphine, chloral, or other anodynes. She walks with a peculiar halting gait, has a pinched expression, and suffers from reflex nervous disturbances. She is treated with the hot vaginal douche, local applications to the cervix and vaginal vault, but is improved by none of them. About this time, massage, rest in bed, milk diet, with varying and unsatisfactory results, will be invoked in her behalf, but nothing in the way of permanent relief results. She is a helpless invalid, and a great sufferer. The ultimate issue of the case may be one of three alternatives: either to hold out until the menopause, when physiological repose and atrophy may bring relief; to remain an invalid for years with opium and all the accompanying misery, ending probably in abscess; or to have the diseased and imprisoned organs with their consequent histological changes removed. I submit that the picture is a familiar one to those who see much of pelvic disorders. In connection with such a pathological state, we must not overlook the persistent influence of the menstrual congestion upon the growth and density of the organized exudate, to which I have previously referred.

The treatment of intra-pelvic inflammations must depend upon the structures involved. The cardinal fact that pelvic peritonitis is always symptomatic, always the sequel and result of infection, must never be lost sight of in formulating any plan of treatment. Catarrhal inflammation of the endometrium may, by the ordinary process of continuity of surface, extend to the tubes and ovaries. Prolonged congestion with thickening of the mucous lining and retained secretions, results in localized peritonitis. Treatment by depletion, cleanliness, antisepsis, and drainage may arrest and limit the inflammatory process and induce a cure by resolution. The peritoneum is an immense lymph-sac, quick to open the avenues of microbic invasion. An untidy exploration with the uterine sound

often conveys the infectious spark which spreads from the endometrium like fire on the prairie. Gonorrhea is a disease leaving in woman the formidable sequelæ of salpingitis, peritonitis, pyosalpinx, ovarian abscess, and often general suppurative peritonitis. Labor and abortion are processes especially prone to admit infection, and, unless rigid cleanliness is observed, are usually followed by varying grades of pelvic inflammation. Rest, the clean, hot douche facilitating drainage, saline cathartics favoring revulsive drainage and depletion, are means of treatment which often arrest or limit the inflammatory process and lead to cure by resolution. To recount the various pathological states of the uterus, ovaries, and Fallopian tubes, with which general or localized pelvic peritonitis is associated would, of course, greatly exceed the limits of this paper.

In consequence of the matting together of the pelvic organs by adhesive inflammation, the exact seat and starting-point of the inflammatory process cannot be decided by the ordinary means of pelvic exploration. Fortunately, the indications for operative interference are so unmistakable that such exactitude in diagnosis is not essential for proper treatment. The localized pain, the fixation of movable organs, the exudation, and, when pus has formed, the rigors, fever, and emaciation are signs too positive to be overlooked by the experienced attendant. When the means that I have indicated fail to secure resolution, and septic symptoms present themselves, we may know that the only treatment is to open the abdomen, evacuate the pus, remove the inflammatory mass (usually Fallopian tube and ovary), cleanse the peritoneum, and establish drainage. Where the disease has gone on to suppuration, the surgeon has no option. Here the only course worthy of consideration is total removal of inflamed, suppurating, and degenerated ovaries and tubes, of which pelvic peritonitis is the result. Equally is it the surgeon's duty to operate in those cases in which the diseased tubes and ovaries—one or both—can be made out by the touch upon the side of the uterus, accompanied with pain and the familiar functional derangement incident to diseased states of the tubes and ovaries. I am presuming of course, upon discriminating knowledge on the part of the physician. To operate early, before adhesions become organized and the inflammatory area extends, and before pus forms and the system is infected, simplifies the operation,

enhances the patient's chances of recovery, and abbreviates suffering.[1] In illustration I may mention hydrosalpinx and hematosalpinx, so prone to purulent change.

When bands of false membrane have imprisoned the Fallopian tubes and ovaries, with the consequent alterations of structure already described; when the tubes are in a state of constantly recurring inflammation, with functions destroyed and secretions retained; when the ovary has become cirrhotic or with the tube has undergone caseous degeneration; when the patient is a miserable invalid and an opium *habitué*, then these organs should be removed and the patient restored to health, home, and society. In cases of limited pelvic inflammation, careful discrimination is necessary in deciding upon operative treatment.

For accurate diagnosis an experienced tactile sense and repeated examinations are required. Many cases of intra-pelvic inflammation of lesser grade are improved and some few cases cured by the hot douche, the application of iodine and glycerine, the supporting tampon, and rest; but by far the greatest number, in which the inflammatory process has been more active and extensive, are incurable without operative interference. Moreover, women dependent upon their own labor for a livelihood, and those of meagre pecuniary resources, are unable to indulge in months of palliative treatment for temporary relief. To those of us who have dealt with cases of long-standing pelvic inflammation at the operating table, and shelled out diseased tubes and ovaries from a mass of organized exudate, the cures claimed for electricity in such cases are difficult to accept. When treated upon sound surgical principles by abdominal section the results are good, the cures permanent, and restoration is complete.

DISCUSSION.

Dr. W. W. Potter, of Buffalo, N. Y.—This paper opens up a most interesting field for discussion in the department of pelvic disease. I agree with Dr. McMurtry that it is a fortunate thing for both teacher and student that the classification which has heretofore prevailed in

[1] Operation by abdominal section should invariably be adopted in preference to puncture of Douglas's space through the vagina.

regard to the nomenclature of intra-pelvic disease has been changed by the more modern pathological studies, so that we have a less difficult task in explaining its phenomena.

When Emmet, who has perhaps done more than any other gynecologist to teach us a foundation for the study of pelvic disease, first enunciated his doctrine regarding pelvic cellulitis, it seemed to be caught up by the gynecological profession as the most rational pathology that had then been made known, and it was adopted, almost universally, as the true solution of this difficult question. As time went on, however, and knowledge increased, Emmet himself found it necessary to modify somewhat the position which he first took on this subject; yet, if I understand him correctly, he rather clings still to the idea that inflammation of the pelvic structures originates somehow in the cellular tissue surrounding the pelvic organs and in which they lie. Another school, represented perhaps by such men as Battey, think the origin of pelvic inflammations is in the ovary itself, and that it spreads out from that point as a nidus. Other men have concluded that they have their beginning in the tubes; that these organs somehow or another become infected as a point of departure, and the inflammation spreads out from that source into the circumjacent tissues. At all events, wherever the nidus is it has been very properly stated in the paper that it is difficult in a given case to fix the precise origin of infection either as to location or genus. It may be puerperal, it may be traumatic, or it may be specific; wherever the nidus begins it sets up an irritation, and from this springs nerve turmoil. From nerve turmoil it proceeds to irritation; from irritation to congestion; from congestion to blood stasis; from blood stasis to inflammation; then to abscess and other accumulation of pus. These are the various pathological steps, unless the disease is arrested in its progress.

Now, in regard to the specific and infectious nature of pelvic inflammations, those forms that have their origin in specific sources of infection are, it seems to me, the most important of all. The fact is, that as we come to understand this subject better—and it might be well to say that the studies of Neisser in the discovery of the gonococcus have helped to elucidate it very much—we almost shudder at the thought that it is a dangerous circumstance for a young woman to-day to accept an offer of marriage; for, in this important civil act, sanctioned alike by Church and State, it may be that she enters upon a contract which will bring to her a spring of woes unnumbered; at all events she is treading upon dangerous ground. It seems to me that this is a very serious question, and one that deserves the fullest consideration of the medical man. I am almost, nay I am quite, of the conviction that it

were well if this important question, before a final acceptance of such an offer, were referred to a competent medical adviser.

Dr. McMurtry has pretty thoroughly discussed the question of traumatism. There is one very great source of infection which comes under this head, that I fear has not received the attention in the past—indeed, it is only just now it is coming to receive—the attention which it deserves. I refer to the indiscriminate use of the uterine sound. It is not many years ago since the possession of a Fergusson's speculum, a pair of dressing forceps, a bit of cotton, and a uterine sound were considered an ample armamentarium for the gynecologist. Thus equipped he was prepared to invade the cavity of the uterus and even beyond, for sometimes he got through into the abdomen with these curiously contrived though harmful instruments. It is my conviction that when Sir James Y. Simpson, in 1843, introduced to the profession the uterine sound, he unwittingly did woman an irreparable damage. I do not mean to say that in his skilled and expert hands he himself was guilty of doing this damage to any great extent; but I do asseverate that it has led up to an indiscriminate use of the sound on the part of the inexperienced which has been prodding the uterus all these years. And I further affirm that either through the damage inflicted upon the organ itself by the manipulation, or by reason of the fact that it has carried upon its unclean surfaces a poison, it has set up in an appallingly long list of cases a variety of inflammatory conditions that range all the way from the most simple congestion or irritation up to abscesses, and even up to chronic invalidism. After no inconsiderable study of this subject, I have nearly reached the conclusion that it were better for the practise of gynecology to-day if there were no uterine sound. It is an instrument I use so seldom that I should be ashamed to have hunted up somewhere in my office the sound that I once looked upon with admiration, but now with horror, because it would probably be found in a state unfit for use, having grown so through innocuous desuetude. The pessary, too, is another instrument capable of doing great harm in inexperienced hands, and I think it was most excellently touched upon in the paper; hence I will not take up valuable time in speaking further upon that subject.

These are some of the thoughts that come to my mind prompted by this *résumé* of a most important subject, and some of those salients that I desire to emphasize as worthy of consideration, in connection with the valuable contribution to the literature of pelvic inflammations to which we have just listened.

Dr. E. E. Montgomery, of Philadelphia.—I have been very much interested in the paper presented by Dr. McMurtry, giving as he does

the latest views upon this much-discussed disease of the intra-pelvic tissues. I would not go so far, however, and say that all these cases should be subjected to operation—by operation, I mean laparatomy. Some of these cases, and particularly such as he described, demand operation; any other procedure would be worse than time lost. There are many cases, however, in which we find, possibly as a result of inflammation, adhesions and the subsequent contraction consequent upon retro-displacement of the uterus. Patients, in many cases, complain of the symptoms which the author has so clearly delineated. A case of this kind came under my care in a Philadelphia hospital: a young woman who had been sick for a number of months, confined to bed, subjected to the opium treatment, and was under the necessity of using from one and a half to two grains of morphine to get relief from suffering. In examination it was found that the uterus was retroverted, and bound down by adhesions, though it could be elevated to a certain degree; the anterior wall of the rectum was drawn up with it, and consequently the displacement recurred as soon as the sustaining force was removed. These are the cases which are often treated by the pessary. I am not so ready to condemn the pessary as my friend, Dr. Potter. The mistake is in using it to correct position. It should be remembered that the uterus should first be placed in proper position, and the pessary then may properly be used as a support. If you depend upon the pessary to accomplish the reposition the patient necessarily suffers great pain. In the case of the patient of whom I have spoken, she was placed under an anesthetic, the thumb introduced into the vagina, pushing up the uterus, while two fingers in the rectum, were carried above the fundus, and hooked down the rectum. tearing it off from the posterior surface of the uterus; the fundus was then pushed up until it could be seized by the external hand and drawn still farther forward, completing the separation of adhesions. Following this, the introduction of the pessary was attended with complete relief, so that it was only necessary to administer a single dose of morphine subsequently, and there was no return of the symptoms. In many cases, the condition is one of adhesive peritonitis, where separation of the adhesions is sufficient to give relief to the distressed. The operation must be accomplished with care, for if the parts are glued together with firm adhesions there would be danger of tearing off softened tubes, or of tearing the substance of the ovaries themselves. In cases of possible salpingitis or pyosalpinx, such an operation would be attended with grave danger. In ordinary cases, the plan I have suggested is, in my opinion, the preferable procedure.

Dr. J. Hoffman, of Philadelphia.—I think when we are taking a thing so definitely marked out and so definitely described as Dr. McMurtry has it, there is no possible excuse for looking here and there for a cause of the lesion. It comes down to a cause, and these cases if not identical must have something of a definite origin to give rise to the trouble. Dr. McMurtry has spoken in his paper of Bernutz and Goupil. If there is any one here who deals with gynecology who has not looked into the book and studied it, and has it not on his table as a source of all information on the subject of pelvic inflammation, I am pretty safe in saying he does not know anything about pelvic inflammation. The book has all we know or hope to know about pelvic pathology. Written thirty years ago, it is the ultra pathology of to-day. The foundation of this book was not theory. It came to them that they were not finding peri-uterine phlegmon, but that it was something entirely different; they went on making post-mortem examinations. Their examinations proved beyond a doubt that the condition ordinarily accepted as peri-uterine phlegmon did not exist, and it does not exist now. If we make a vaginal examination, we find a hard mass on the side of the pelvis, a mass unyielding and extensive; it is easy to say it is peri- or parametritis. When we come down to it, and find that there is no cellular tissue there except about a line in thickness, we see the inflammation of the cellular tissue does not exist, or at least not in the way the majority of theorists try to explain it. When we understand that the inflammation is of the appendages—more correctly speaking, the ovaries and tubes—is not only confined in them, but involves adhesions to the pelvic viscera, herein comes the point for diagnosis. A gynecologist who expects to tell the size of the trouble by the feeling vaginally, is going to fall into error. You cannot tell what the lesion is going to be. The adhesion is the thing that most frequently makes the size. It is not the size of the lesion, but the nature and extent of the adhesions. The point that I wish to make is, that the size of the mass is a most deceptive thing, and that the size must depend upon the number, quantity, and quality of adhesions. Now, as to the cause for the inflammation, Dr. McMurtry referred to peritonitis and spoke of idiopathic peritonitis. I think of all the myths that have ever been written of (it is almost equal to Dr. Dunlap's cure for fever—salivation), this thing of idiopathic peritonitis takes the lead. Peritonitis is a thing that must have a cause. If I meet a man, woman, or child, and find the belly tense and swollen, I will not fold my hands and say it is a visitation of Providence. It has not started there for nothing; 999 times out of 1000 it is inflammation with a definite origin. I think, mostly, this inflammation in men

comes from a suppurating vermiform appendix. Sometimes it seems to be developed from cold. In woman the cause of pelvic inflammation seems to be too well made out for us to have a doubt about it. We can begin with cold at menstruation. We can go on to falls and bruises. In the married state we can find miscarriages, and abortions, and puerperal infections. These causes will probably cover most of the cases. Then we come down to the gonorrheal cause. In a discussion some time ago, a prominent surgeon said he would as soon look to the moon for the cause of pelvic inflammation as to look to gonorrhea. Bernutz and Goupil have a list of ninety-nine cases. One-half of their cases admittedly have been of gonorrheal origin. This gonorrhea is just as real to-day as it was thirty years ago to Bernutz and Goupil. There is no more question about it. We do not have to have any special bacillus to get an inflammation; you only need a simple, irritating pus. This has been proven beyond question. It has been possible to produce inflammation by vaginal douche during menstruation. We find it in about fifty per cent. of our cases. There is no use in shutting your eyes to it. The evil exists, and the way to get around it is not to believe the text-books, but simply take the evidence of men who have worked in it, and who see it, and who would be glad if it did not happen, for it is such dirty work to handle. It is an evil that has got to be taken down, and the sooner we believe it, the sooner we appreciate it, the sooner we will be careful in treating it, and the fewer blind babies we will have.

I do not believe much in massage. In many cases it is dangerous. There is no use in contradicting a man who has had experience and is honest. Dr. Montgomery has given the good side of it. If I have a wide experience, and with a wide degree of success, no man getting up and telling me I am wrong is going to change my mode of treatment.

A word about electricity. These are fashionable times for electricity, electric sounds, and batteries of all conditions. You find a battery in nearly every gynecologist's office. I do not believe they will be so numerous after awhile. The men who do the most with electricity are the ones who have been in the abdomen the least number of times. They are the ones who have dealt least tangibly with these things with their fingers. No one will dispute the power of electricity in some respects, but to say that it will melt adhesions that require strength and skill, and sometimes scissors and knives to relieve, is utter, and entire, and great, absolute nonsense. Men who make these cures have done one of two things. They deceive or are trying to deceive themselves, or they are not telling the truth.

Dr. W. H. Wathen, of Louisville, Ky.—Dr. Hoffman has again reminded us of the use of electricity in gynecological practise. I am not the advocate of electricity as generally used; its use in gynecology, to get good results, must be confined to very few men. I have no electrical battery; probably will never purchase one; I have studied the subject pretty thoroughly from the standpoint of Apostoli and his followers; I have read nearly all that the anti-electrical school has written; but I cannot agree entirely with Dr. Hoffman in his views just expressed in regard to electricity, nor in his strictures upon those who use it. He refers to the use of electricity for cleansing out a pelvic pus cavity. I do not believe there is any physician with enough learning and experience to practise gynecology who has not too much sense to attempt to do this; nor do I know of any one who makes such claim. The assertion of Dr. Hoffman that electricity can do no good in uterine or pelvic disease is not sustained by results correctly observed. In inflammatory exudates after the acute stage of pelvic peritonitis, with no collection of pus, where there is a lack of nutrition of the part, the judicious use of electricity may result and has resulted favorably, by its action on the nerve and blood supply of the pelvis, thereby stimulating nutrition and causing the dissipation and disappearance of inflammatory products. There are instances of gonorrheal inflammation of the tube, and of the peritoneal and cellular tissues, that, so far as any subjective or physical symptoms indicate, are entirely relieved. I will refer to one case—I have seen several: when I was called in consultation her pelvis was so filled with inflammatory products caused by gonorrhea, that her uterus and tubes were as immovable as if imbedded in plaster-of-Paris; that was five years ago. Gradually every vestige of this deposit disappeared. The uterus became more and more movable, finally perfectly movable. The only trouble she had was painful menstruation caused by a flexure in the cervical canal, which was promptly and perfectly relieved by rapid dilatation. With the patient anesthetized I could find no remains of the pelvic inflammation. I do not agree with Dr. Hoffman in his belief that the inflammation is always confined to the pelvic peritoneum because the thickness of the cellular tissue about the uterus does not exceed a line. Then there can be a great deal more inflammation of the cellular tissue than of the peritoneal tissue, because the latter is not a line in thickness. Is it possible to have extensive inflammation of the peritoneum without having inflammation of the pelvic cellular tissue so intimately connected with it?

I cannot believe he is correct in saying that all that is or ever will be known about pelvic inflammation will be found in the book of Bernutz and Goupil. That is the way people have talked from pre-historic

times, and if people had been controlled by such talk the world would have made but little progress. Galileo was persecuted because his discoveries conflicted with preconceived and accepted ideas, but in this enlightened age we have a different state of affairs. I do not wish to say a word of criticism upon the work of Bernutz and Goupil, but to speak words of the highest praise; it is invaluable to the student, and contains facts in pelvic pathology years in advance of its time; still I beg to say, that it would be a very unfortunate thing for the medical profession to sit silent, and admit that nothing more was to be learned upon this subject. I hope to live to see something more discovered that will add useful knowledge to this invaluable work.

Dr. Joseph Price, of Philadelphia.—I sincerely trust the gentleman who has just taken his seat will live long enough to recognize pus, and its frequent occurrence in the pelvis, that he may have occasion to relieve suffering and save lives; and, again, to recognize that there is still some sublime ignorance upon the subject. It is absolutely impossible for one to lie about the frequency of pus in the female pelvis. This I have been demonstrating in my own work for years. Dr. McMurtry has boiled down a great deal of history in this excellent paper, with personal and practical experience added to it. I accept it wholly. It is about as condensed and unique as it is possible to make it. I express my appreciation of the paper as in advance of the present time. I cannot accept Dr. Emmet's pathology, and never could. Dr. Wathen has said nothing about ever discovering pus in the pelvis, hence I think it would be best for him to keep quiet until he recognizes it, and sees how frequently it occurs. In regard to where pelvic inflammation begins: pelvic perimetritis and parametritis as we were taught, I know nothing about. I have read all the old books on this subject, and I wish I could consign them all to the flames. "A pelvis poured full of plaster," and all that sort of trash, is a common metaphor. When Bernutz and Goupil commenced their researches their first two cases died with masses, right and left, recognized ante-mortem. In the first two cases recorded, I believe, they enucleated pus tubes and ovaries. Both died. They recognized more than we do at present—more than we teach at present. They went further, and said many of these cases die of phthisis. I find many pus cases too far advanced with pus cavities in their lungs to stand the operation. I have gone twice to operate on patients with pelvic trouble, and have asked prominent diagnosticians to examine these patients, and they have counselled "hands off." It would have only been a distress to me and a blow to surgery to have done abdominal section. To me, pelvic troubles begin very largely in tubes and ovaries. It may be due to filth, to dirty or

traumatic instrumental interference, or to gonorrhea. I have proved it hundreds of times by careful examination. In public practice I have asked the wife to send the husband up in the evening, giving my name and address. I have never failed to find a clear history of gonorrhea—never. You will find all over the land hundreds and thousands of women married ten or fifteen years who have never conceived, and you will find masses in many of these cases, right and left, and it is as easy to put your hand on them as it is to put it on the watch in your pocket. They come into your offices and put their hands over the trouble. The diagnosis of such troubles is to me and my pupils exceedingly simple. Gonorrhea I claim to be the cause in a majority of these cases. I exclude most other troubles, such as serofula and tuberculosis, "et id genus omne," and also puerperal cases. There are a few puerperal cases that die from gonorrhea. There are a few cases on record of this character where the gonorrhea still existed in acute form in the husband. Adherent displacements due to tubal disease are, indeed, difficult to correct. Primarily the tubal disease is the cause of the adhesion and displacement. I know you can have inflammation of the cellular tissue from the scalp to the feet; but I believe pelvic troubles independent of tubal and ovarian disease are as rare as leprosy. It is surprising the number of women suffering with ovarian and tubal disease following such a procedure as Emmet's operation on the cervix, or rapid dilatation of the cervix. Some of the deaths from Emmet's operation are due to unrecognized preëxisting pus tubes. The mortality of operations for laceration of the cervix at one time became larger than operations for simple ovariotomies. We have here a solution for Emmet's uttering some words of caution about indiscriminate operation. I am satisfied that dilatation of the uterus is a very frequent cause. I have in these last two weeks examined half a dozen women who I believe can only be cured by abdominal section, and they have all been dilated frequently. I very commonly find pus tubes and ovarian abscesses in patients in whom the cervix has recently been dilated. The picture given by Dr. McMurtry is about as clear and perfect as Rubens could have painted it. Dr. Thomas replaced in his office a retroflexed uterus, and they wired him in a few hours that his patient was dying.

Massage.—I scarcely feel like expressing myself on this subject.

Electricity.—I feel that the chances for the adoption of electricity by men of experience and judgment, men who have studied pelvic inflammatory troubles above and below, men that "think," are about as great as the chances of the numerous fire departments abolishing their engines and pressing into service an ordinary Davidson

syringe. We have an electrician in Philadelphia who, I believe, scarcely knows whether the pubis or sacrum is in front. If a woman had a tumor as large as when she is at the seventh or eighth month of pregnancy he might find it. He reports a case of a suppurating fibrocystic tumor, sloughing, and expelled *per vaginam*. Mark, a fibrocystic tumor! He reports this case as one of his failures—as one of his accidents.

Treatment.—For many, this means iodine, glycerine, cotton, hot irrigations, and everything we have ever heard of, with some relief in mild cases and some deaths. I remember very well my first case. I called two professors and asked them if they would permit me to do section for pus. They both raised their hands in holy horror, and suggested I send the woman to the hospital. I sent her. On the fifth day she died, with pus coming through her bladder. Both ureters had sloughed. Electricity would have just restored these ureters, and transformed the pus into healthy urine!!

I saw a case two weeks ago in Pottsville. Thirteen years ago the woman had a sponge tent introduced into the cervix. It was the treatment and teaching of a celebrated obstetrician, Professor Wallace, to correct every anteflexion. This woman remained in bed six months after the introduction of the sponge tent. Three large sinuses opened; pus discharged for five years. Another prominent obstetrician and gynecologist incised the vaginal vault and established drainage. Eight years after I did a section, and put in a drainage-tube. She was greatly emaciated. She still lives, after two weeks, and the attending doctor thinks she will get well.

Martin has instituted a treatment that is quite foreign to the practise of American operators in the management of these abscesses. He does an abdominal section if there is a large pus tube or abscess; fixes it over his vaginal hand, incises it, introduces a drainage-tube, closes the abdomen, and allows it to drain through the vagina. If this is an isolated abscess, it will relieve the patient for a while, but not cure her. A big, cheesy tube will not come away. When we have so simple means as a small incision above the pubis, a simple enucleation with two fingers, shelling out a diseased tube and ovary and tying it off, thus simplifying the treatment of a diseased organ, and perfecting a cure, this certainly is the better way. If we could enucleate an abscess in any other part of the body we would do so.

A word about gynecological instruments. Dr. Potter condemned the use of the sound. I would like to add the same condemnation to most gynecological instruments—the sound, the dilator, and all these instru-

ments—many of them are relics of barbarism. We shall relieve suffering and prolong life by simplifying our methods.

Dr. McMurtry has, with great pains, given us the best pathology of the present day. Had it been recognized thirty years ago that Bernutz and Goupil were on the right track, many hundreds of lives would have been saved and much suffering prevented.

Dr. McMurtry (closing the discussion).—Much confusion connected with this subject comes from faulty nomenclature. We hear of cellular abscess frequently. As a matter of fact, there is no such condition, for the pus-sac in reality is the diseased tubes and ovaries. After adhesions are formed pus may burrow in various directions, following the route of least resistance. Pus may traverse the cellular tissue planes, but the seat of abscess is within the peritoneum in the tubes and ovaries.

VAGINAL HYSTERECTOMY.

By E. E. MONTGOMERY, M.D.,
PHILADELPHIA.

Although vaginal hysterectomy has been much discussed of recent years, it is not a modern operation. The superficial observer would suppose that Freund, in 1878, was the first to direct attention to the advisability of the removal of the uterus for malignant disease, and that his work had led Czerny to the study of the subject, but closer investigation shows it to be of much earlier origin. Andreas Crucé, in 1560, probably did the first operation for the removal of the uterus. A prize was offered in 1810 for the best essay upon the subject, which was awarded in 1814 to Gutberlet, who presented rules for the abdominal operation. Sauter (1822) removed the uterus by the vagina, and the operation was repeated by Langenbeck, Blundell, Recamier, and others, so that West was able to present a collection of 25 operations, of which 22 died.

Naturally this terrible mortality led to the discontinuance of the procedure. Czerny did the first vaginal hysterectomy according to modern methods, April 12, 1879, but the difficulties of the procedure so impressed him, that his next two operations were done by Freund's method, and it was not until the operation had been several times performed successfully by others that he returned to the vaginal method. The eagerness with which this procedure has been accepted can be appreciated when the results of several hundred operations can be presented, and individual operators present lists numbering 60 and 80 cases.

As in all new operations, it is important to determine the class of cases to the treatment of which it can be appropriately applied. A glance at the literature shows that this procedure

has been practised for the cure of cancer of the cervix and body of the uterus, prolapsus in its varying degrees, retro-displacements, endometritis, and various nervous disorders.

The present paper will discuss its application to the treatment of cancer; at the same time we would deprecate the wide latitude that has been given it, believing, indeed, that the cases are rare in which it is even applicable to the treatment of prolapsus.

In malignant disease, it may be said to be indicated in every case in which the disease is as yet confined to the uterus. Experience has shown that the radical cure is more certain when the body is the seat of onset; so evident has this been, that some have advised to confine the operation to disease of the body or internal os, giving the high amputation preference where the cervix only is involved. We cannot, however, but coincide with the opinion of Brennicke, that when any portion of the uterus is the seat of cancer, however slight, extirpation of the whole organ is indicated.

For the performance of the operation, the uterus should be freely movable; the disease should not have involved the vagina, the cellular tissue, the broad ligaments, or the pelvic lymphatic glands. The presence of any of these complications may be considered as, to that degree, contra-indicating it. It must be remembered, however, that the uterus may be fixed by a parametric inflammation and not from the extension of malignant disease. In every case the affected organ should be carefully examined through the rectum, and when nodular masses can be felt in the broad ligaments the operation should be decided against.

The work of a number of operators demonstrates that the operation is not necessarily a dangerous one.

Maurice Hache (*Rev. Sc. de méd. Par.*, xxix. 721–739) gives an analysis of 495 operations, in which the absolute mortality was 24.29 per cent.

When it is remembered that this is the work of a large number of operators, it will be seen that the mortality is but little, if any, greater than that of ovariotomy. In skilful hands the mortality is less than 10 per cent. Staude has done 20, and Brennicke 21 operations, without a fatal case; Leo-

pold 48 operations with but 3 deaths. Munchmeyer has lately given the results of the obstetrical clinic at Dresden where, from 1883 to 1889, 80 vaginal extirpations for carcinoma have been performed with 4 deaths, a mortality of 5 per cent.

As operators better appreciate the importance of a proper selection of cases, the average mortality will be reduced to between 5 and 10 per cent. The first consideration, in every operative procedure, must be the danger, which, by the statistics just quoted, is seen in this to be comparatively slight. In addition to this, however, in order to justify ourselves in advising and urging an operation, it must be shown that it is effective in accomplishing the purpose for which it is suggested. If it does not give some hope of radical cure, it is not wise, or right, to subject our patients to so difficult a procedure, and one not unattended with danger, however careful the operator.

Of the 495 cases analyzed by Hache, in each 100, 23 succumbed to the operation; in 15 it returned in three months; in 13 in from three to six months; in 13 in from six to twelve months; in 10 in from one to two years; 26 are still well at the end of two years.

Of the 80 cases from the Dresden clinic: 4 died from the immediate effects of the operation; 10 from a recurrence of the disease; 4 from intercurrent affections.

In 41 cases operated upon during the last year there has been no recurrence. Of 17 women operated upon two years ago or over, none has had a recurrence. Amongst the last series are three who have had no recurrence for three years, one for four years, and one for five years. A case in which Freund removed the uterus by laparatomy, in 1878, for cancer of the neck, is still alive.

In comparison with other operations, that of Freund with its 71 per cent. mortality is not to be considered.

Supravaginal amputation of the uterus for cancer of the body is attended with a mortality of 28.5 per cent., with the ultimate recovery from disease of 14.4 per cent. out of 100 operated upon.

Supravaginal amputation of the neck, according to Schröder, had a mortality of 12 per cent., with the definite recovery of

10.56 per cent. Martin, however, asserts that the results in the hands of others have not been so favorable.

Pawlik (*Wiener Klinik*) gives the result of 136 amputations of the cervix with the galvanic cautery, as follows: mortality of the operation, 7 per cent.; definite recovery in 100 cases, 6.5 per cent.

Vaginal hysterectomy done under the later and more approved methods is scarcely more fatal than the partial operation, while the increased immunity against the return of the disease more than justifies the slightly increased risk.

The results of the operation do not compare unfavorably with extirpation of other organs for similar conditions. Thus Billroth fixed the mortality of extirpation of the mammary gland with the removal of the glands from the axilla at 10 per cent. In Kuster's service, later, this was found to be 5.2 per cent.

In the face of such statistics, it seems difficult to find justification for the following conclusions from a paper by A. Reeves Jackson, in 1883, and practically repeated in a paper before the International Medical Congress of 1887, in which he says:

"First. That the diagnosis of uterine cancer cannot be made sufficiently early to insure its complete removal by extirpation of the uterus.

"Second. When the evidence can be established there is no reasonable hope of effecting a radical cure, and other methods of treatment, far less dangerous than excision of the entire organ, are equally effectual in the amelioration of the suffering, retarding the progress of the disease, and prolonging life.

"Third. Extirpation of the uterus is highly dangerous, and never lessens suffering, except in those whom it kills, and does not give a reasonable promise of recovery, and should not be adopted in modern surgery."

The methods of operating are almost as many as the number of operators. The lithotomy position for the operation is the one observed by the majority of operators, although a few prefer the Sims posture. Some first open the anterior fornix of the vagina, and others the posterior, while Staude emphasizes the importance of suturing and separating the lateral tissues as the preliminary step. Then the uterus is anteverted, retroverted, split in two halves, or drawn down *in situ*. The broad ligaments have been ligated *en masse*, or in sections. The wound is treated by suturing the peritoneal surfaces, the vaginal sur-

faces, or both; or the peritoneal and vaginal edges are brought together by sutures, thus covering in the cellular tissue, or it is treated as an open wound, without the use of any sutures. Some use drainage, others not; so also with the vaginal tampon. Three important considerations to be kept in mind should be hemostasis, asepsis, and the securing of proper drainage. In the past, the control of hemorrhage has principally been accomplished by use of the ligature, either *en masse* or in sections. The objections that may be made to this method are: the difficulty of application in a narrow vagina, where the uterus is not readily displaced downward, slipping of the ligatures, and hemorrhage from vessels which after retraction are difficult to reach; the length of time necessary for the introduction and tying of the ligatures; and the danger of including and compressing the ureters. The latter danger is much increased by the almost necessary eversion of the fundus uteri, either forward or backward. Some have applied forceps, cut away the uterus, and afterward ligated the stumps, others have found it necessary to leave the forceps in place to prevent the ligatures slipping. The control of hemorrhage by forceps was suggested by Spencer Wells, Knowsley Thornton, and others, but Richelot was probably the first to rely upon them for this purpose.

They afford the following advantages: First, it is unnecessary to change the position of the uterus, and this saves the danger of infecting the peritoneal cavity with the discharges from the diseased parts; second, there is more complete control of the broad ligaments, with the vessels which traverse them; third, there is less danger of including or injuring the ureter; fourth, it is unnecessary to provide other or special means for drainage; and fifth, they afford a great saving of time. By the old method of eversion of uterus, ligation of ligaments, suturing of peritoneum, and drainage, the operation required from one and one-half to four hours for its completion; by the use of the clamps the operation can be accomplished in from fifteen to thirty minutes.

The plan of procedure I would recommend would be: First, thorough washing and disinfection of the external genitalia, the vagina, and the uterus. Where there is much sloughing diseased tissue, previous curetting, application of

iron, and packing the vagina with iodoform gauze should be practised. Second, with bladder and rectum empty, the patient is placed in the lithotomy position, the uterus exposed by perineal and side retractors and seized with strong vulsella forceps; the three- or four-pronged instruments are better for securing and retaining a hold in the diseased tissues. Third, after thorough irrigation of the cavity, an incision with knife or scissors, preferably the former, is carried about the cervix, severing the vaginal mucous membrane. Care should be observed, anteriorly, as to the relation of the ureters and bladder. If vessels of any size are opened (which is rare) they may be secured by hemostatic forceps. Fourth, keeping close to the uterus the tissues are separated, anteriorly and posteriorly, until the peritoneum is reached. In this process the vulsella have the advantage over the suture sometimes used in that, with them, the cervix can be elevated or depressed at will. Fifth, after renewed irrigation and sponging out of the vaginal canal, an opening is made first through the posterior cul-de-sac, the peritoneum torn through with the finger up to the broad ligaments and a large sponge inserted, to which a ligature for its withdrawal is attached. The sponge serves a double purpose—retaining the intestines and preventing the soiling of the peritoneum; the opening is then made through the anterior peritoneum; this may be expedited by passing two fingers behind the uterus and over the fundus, and pressing a pair of forceps through the peritoneum against them. The fold should then be torn down to the broad ligament upon either side. Sixth, hooking down the broad ligament with the finger, or a blunt hook, a clamp or pair of forceps is applied to one and then the other close to the uterus, the latter cut away with a knife, and withdrawn. Seventh, the cavity is carefully sponged, any bleeding points in the anterior or posterior walls secured with forceps, and the sponge withdrawn from behind the uterus. Its withdrawal drags down the torn edges of the peritoneum so that the surfaces lie in contact. Eighth, a tampon of iodoform gauze is placed in the vagina which, with the forceps, acts as a drain. It should not be carried so high as to separate the peritoneal surfaces.

After-treatment.—Judging from my own experience, the operation is usually followed by considerable shock, the temperature varying between 95° and 97°, most probably due to the effect upon the sympathetic system, from the constriction of the pelvic nerves in the broad ligaments. The clamps may be removed at the end of twenty-four to thirty hours. The gauze may be permitted to remain until the end of the third or fourth day. After its removal, the vagina should be irrigated two or three times daily with a two per cent. acid carbolic, or a 1 to 5000 solution of acid sublimate. After the fifth day drainage may be promoted by permitting the patient to assume a semi-reclining position, and she may be allowed to sit out of bed at the end of ten days. In an ordinary case the temperature is but little higher than normal.

It has been my privilege to operate but three times; the histories of the cases will be briefly related.

Case I. (reported in the *Philada. Med. Times*, March 15, 1889, p. 409).—Mrs. McC., æt. forty years, mother of two children, was seen with Dr. Nock. She had suffered from hemorrhages, pain, and an offensive discharge for some months. Competent microscopists had pronounced the disease malignant. Uterus freely movable, and the disease confined to the cervix.

October 4, 1888, assisted by Drs. Nock, West, and Rively, and Messrs. Croskey and Maier, the uterus was removed. Patient in lithotomy position, the vaginal mucous membrane cut by the knife, and tissue pushed off before and behind, until the peritoneum was reached; the latter was opened posteriorly and a large sponge introduced. In the care to avoid injuring the bladder, the dissection was carried into the structure of the uterus, lengthening the operation. The dissection was completed by passing two fingers behind the uterus and over the fundus. After opening and tearing off the anterior peritoneum, the organ was anteverted, the broad ligaments seized with forceps, and the uterus cut away. The forceps sprung, permitting a portion of the ligaments to slip out. Some bleeding vessels were seized with the forceps, so that the patient was placed in bed with eight forceps hanging from the vagina. An iodoform tampon was introduced. No sutures and no further drainage. Duration of operation one and a half hours. The small forceps were removed at the end of thirty hours, and the large ones in sixty. The convalescence was very satisfactory, and not attended by an unpleasant symptom; maximum temperature 100°.

August 23, 1889, I made a careful examination of this patient, and found the tissues healthy. General condition good.

Case II.—Mrs. D., æt. fifty-one years, mother of several children, ceased to menstruate at forty-six; a year ago had a return of bloody discharge, which at times since has amounted to a hemorrhage. Pale, weak; cervix

healthy; body of uterus enlarged and hard, the introduction of a small probe was followed by bleeding. Scrapings obtained by curetting the cavity were negative. Age of patient, interval since menopause before the return of the flow, size and density of the body, with frequent lancinating pains, led to the diagnosis of probable carcinoma of the body.

February 14, 1889, vaginal hysterectomy. After separation front and back, uterus with difficulty anteverted, clamps applied after some effort, uterus removed, and the parts carefully sponged and tampon introduced. Clamps were removed at the end of seventy-two hours. Temperature immediately after operation 96.2°. Subsequent progress normal. The examination of the uterus did not confirm the diagnosis of malignant disease. Duration of the operation thirty minutes.

Case III.—Mrs. S., æt. forty-two years, mother of two children, hemorrhage for years, considerable pain, and an offensive discharge. Uterus freely movable, no thickening of the broad ligaments, but the cervix was excavated and the vaginal portion destroyed. Cavity curetted and packed with iodoform gauze.

July 5, 1889, assisted by Dr. Wathen, of Louisville; Dr. Sangree, and Mr. Maier, extirpation was done. The operation was rendered difficult by the loss of the vaginal cervix, by a long narrow vagina, and inability to depress the uterus, which was also hypertrophied. Was unable to pass the finger above the broad ligament, so burrowed through it below the ovarian artery, applied a clamp on either side, and cut away the portion of ligament compressed, thus enabling the uterus to be so depressed that the forceps could be applied above the ovaries, and those organs were removed with the uterus. Toilet of the vagina and gauze tampon. Duration of operation thirty-five minutes. Temperature 95°; became normal in a few hours. Clamps were removed in twenty-eight hours. Subsequent progress excellent for one week. Played with pet dog on seventh day, the following day complained of stiffness of the jaws, which developed into severe tetanus, and death occurred on the fourteenth day.

In the first two operations, the uterus was anteverted; this in one was a difficult procedure, in both was unnecessary, and added to the difficulty of the application of the clamps. The third case gave every promise of recovery for the first week; I can only ascribe her death to my imprudence in not guarding against the possible infection with the bacillus tetani from the dog.

The forceps were found, in the first case, to spring and permit some of the tissues to slip from their grasp. To obviate it the tabs, as seen in Fig. 1, were attached to the blade.

The clamp is a modification of Greig Smith's, and has proven very serviceable in the last two cases.

Fig. 1.

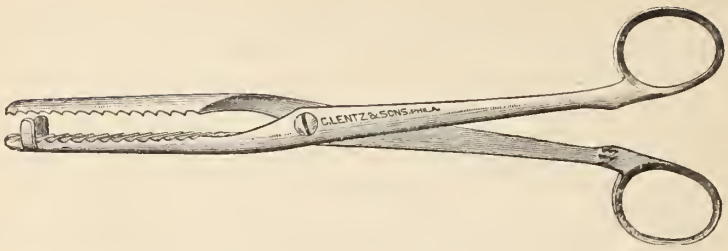
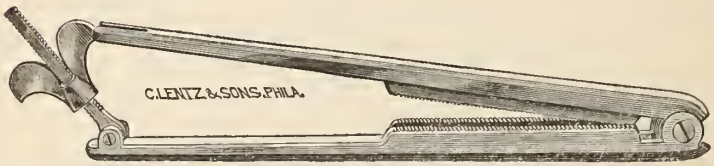


Fig. 2.



Upon a careful consideration of the operation of vaginal hysterectomy, I feel justified in arriving at the following conclusions:

1. That in all cases of cancer, when confined to the uterus, whether of the body or cervix, vaginal hysterectomy is the only justifiable operation.

2. The operation, when performed under proper precautions, is not necessarily attended with a greater mortality than is ovariotomy, and should be as urgently advised.

3. The operation should be done as early as the diagnosis can be determined, and when the condition is one of doubt the patient should be given the benefit of the doubt and the organ removed.

4. The control of hemorrhage by the forceps or clamp, and the open treatment of the wound are the choice procedures.

THE DRY EXTRA-PERITONEAL TREATMENT OF THE STUMP IN HYSTERECTOMY.

By JOSEPH PRICE, M.D.,
PHILADELPHIA, PA.

The question as to the best treatment of the stump in hysterectomy will probably never be settled as invariably the same for all cases. Keith's verdict that the clamp is unsurgical, though often quoted and agreed to, seems to be directed rather at its lack of attractiveness than to its inefficiency, excepting, of course, cases in which the pedicle is very short, necessitating great force and tension in order successfully to apply the Koeberle serre-nœud. The advantage possessed by the screw clamp over all other devices for treating the pedicle, is the certainty with which it controls hemorrhage in succulent stumps. When the simple ligature is applied, the stump hollowed out, and the peritoneum accurately stitched over it, there is no doubt that, from a cosmetic point of view, an ideal operation is done. But in abdominal surgery, in order to accomplish good work, we must drop the idea that our stitches must be introduced as in a fashion plate. A ligature where it is needed, not where it will strike on-lookers as a bold exploit and make a bid for originality, is what, more than all others, abdominal surgery demands. So, as to methods, not that which looks most artistic, but that which regards adaptability to each special case or set of cases, is to be chosen. Ideal surgery is the surgery that saves lives, not caring for methods which, while they may appear well in print and photographs, have little else to recommend them. A great objection to the use of the clamp in hysterectomy has hitherto been the long time required for the separation of the slough, and the consequent delay in the healing of the incision. While

this objection can be raised to preceding operations, it need no longer give cause for apprehension. The method I now use with invariable success is the following: After the clamp is applied the stump is cut off and trimmed down so far as seems compatible with safety. The stump is then drawn down into the lower angle of the incision, and its peritoneal covering above and below the wire stitched to the abdominal peritoneum, two or three stitches being all that are required. This shuts out all possible chance of sepsis.

A dry dressing of iodoform gauze is applied. Other antiseptic powdered substances, such as salicylic acid, or subnitrate of bismuth, may be used if desired. In case of large succulent stumps the bichloride may be directly applied. The result of this treatment is that the stump is completely mummified, and in a few days, varying according to the progressive tightening of the clamp, drops off without odor or discharge. The union of the incision is scarcely delayed. That absolute safety may be assured it is of the greatest importance that a reliable wire be used. The daily tightening of the clamp keeps up a constant strain on the metal, while at the same time it brings the wire into a greater curvature. The metal must be, therefore, pliable but strong, and not ductile, as is copper. To fill these conditions, I find the "Delta metal" most suitable. I am glad here to be able to quote Mr. Bantock's opinion of this metal for the purpose referred to. He says:

"If you have one serre-nœud of good size it will last a lifetime, as it only requires washing with a solution of sulphurous acid to get it quite clean again, and then rubbing it with a little whiting or chamois leather, no grinding it like the steel ones. The same may be said of the pins. The great advantage is that it does not undergo decomposition, or oxidation, and consequently does not blacken the stump and make the discharge stink. The wire is also more pliable than iron and less liable to break.

SUCCESSFUL REMOVAL OF A FIBROMA OF THE RIGHT OVARY DURING PREGNANCY.

By J. HENRY CARSTENS, M.D.,
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As our Association is devoted to the cultivation of knowledge in whatever relates to obstetrics, gynecology, and abdominal surgery, it seems to me eminently proper to report a case which comes within the range of each and all of these departments of medical art and science.

Fibroma of the ovary is very rare, and I could find no record of a case complicating pregnancy in a manner requiring its removal. You are, therefore, spared a lengthy report on the literature of the question, and I can proceed to a simple report of my unique case.

During the latter part of April, 1889, there called at my office Mrs. L., aged twenty-six, white, married four years; no children or miscarriages. For more than one year she had severe trouble with her water, characterized by a frequent desire to pass it and partial loss of control of the sphincter vesicæ. She had been treated by different irregular physicians without benefit. She had noticed a hard growth in the lower part of the abdomen, which had increased rapidly during the preceding four weeks, due, she thought, to a stoppage of the menstrual flow, which has not appeared since February 24th, or about two months previous to this consultation. Her general health and family history are good.

Examination revealed the pelvis filled with a hard growth, which seemed to be immovable—the uterus nearly in the centre (a little to the left). The tumor was pressing on the bladder and causing the distress of the viscus. I could not make out if the growth was attached to the uterus or not. From the soft, velvety feeling of the cervix I suspected pregnancy. I proposed April 29th for a consultation and thorough examination under chloroform. Dr. N. W. Webber kindly assisted me on the above date. We found a hard tumor filling the right and anterior part of the pelvis; in Douglas's cul-de-sac was another smaller hard tumor. The uterus, which was to the left and between the growths, was soft and enlarged, but not adherent to the tumors. The latter was movable to quite an extent while the patient was under the influence of the anesthetic. The pregnancy prevented a more thorough examination, so that we made the following doubtful diagnosis: pregnancy of two months;

a pelvic tumor, which might be either a uterine fibroid with a long pedicle, a sarcoma, or a hard tumor of the ovary.

The next question was, What should we do? The continuation of the pregnancy would cause the uterus to rise above the growth, and at full term the latter would prevent delivery except by Cesarean section. The production of an abortion was the only hope, and later a laparatomy. But Mrs. L. would not listen to that, as she was very anxious to have children. It seemed to me that the patient had a retroflexion of the uterus causing sterility, the growth of the tumor gradually lifting the uterus up, so that finally impregnation could take place.

One other means remained: exploratory laparatomy and removal of the growth, if that proved feasible. To this she consented. For various reasons the operation was postponed from week to week until May 27, 1889, when I proceeded to operate at her home, assisted by Drs. Webber, Hutton, Smith, and Scherer. The antiseptic precautions so well known to you all were taken before and during the operation. Chloroform was the anesthetic used. I first made an incision seven centimetres in length in the usual manner. When the peritoneum was opened a very hard nodular tumor came into view; it was movable, and could be extirpated. I increased the abdominal wound to fifteen centimetres. Having more room now, I found the growth adherent to the bladder. This was easily loosened, as were also slight adhesions to the intestines and right side of the pelvis. One firm attachment to the omentum required a ligature. The tumor was not adherent to the uterus, and could now be removed without difficulty, the pedicle being long and about one centimetre in diameter. It was tied, and I thought best to include the right Fallopian tube, which was also removed.

The left ovary was carefully examined and found perfectly healthy; it was therefore not removed, although I do not think this good practise, *as a rule.* In this case, however, the patient was anxious to have children, and the present pregnancy might not go to term.

The toilet of the abdominal cavity, which was very simple, as no blood had entered, was then quickly made, and the external wound united with twelve deep and four superficial sutures of silkworm gut.

Reaction was prompt; no bad symptoms developed; the temperature never rose above 99.5°. On the second day one-half ounce of Rochelle salt was given, which acted promptly. The only trouble I had was to keep the patient from eating, as she had a constantly good appetite. On the sixth day one-half of the sutures were removed, and the next day the remainder; union was firm. On the eighth day she sat up, and on the tenth she could walk about. Since then she has been able to do her light household duties. The pregnancy continued; she is now just seven months advanced.

The tumor was very hard and nodular, about twenty centimetres long and twelve centimetres in diameter. In the middle was a constriction in which the uterus had rested, and which gave us the idea of two tumors at first. We thought it was a sarcoma, but a microscopic examination by Dr. George Duffield showed only pure fibrous structure. The ovary has entirely disappeared in the growth.

Tumor after being in alcohol four weeks. (From photograph.)

The only serious questions in my mind were: Was the operation justifiable? and, Was it right to leave the other ovary?

The paper read at our last meeting by Dr. Potter, and the discussion that followed, strengthen me in the opinion that in cases such as this, and similar ones, pregnancy is no bar to an operation, and that abdominal section is preferable to the induction of abortion.

DISCUSSION ON THE PAPERS OF DRS. MONTGOMERY, PRICE, AND CARSTENS.

Dr. W. H. Wathen, of Louisville.—I was very much interested in the papers read by Dr. Montgomery and by Dr. Price. These are subjects that should be discussed very carefully, and all the practical facts bearing upon them that have been discovered by the experience of operators should be carefully considered, because there is great diversity of opinion as to what is the best treatment. I had the pleasure of seeing Dr. Montgomery operate in one of the cases reported during last summer, and can bear testimony to his expertness. In studying vagiual hysterectomy it is hardly fair to draw any conclusions as to the future result based on the statistics of the past. Where the operation was performed by abdominal section we could not expect anything but bad results, and no one should again resort to that method in hysterectomy for cancer. Even from the statistics of the operations of Schroeder and Martin I do not think we can draw conclusions as to tho results of the future, for their technique was faulty. In hysterectomy it is important to operate quickly, to control hemorrhage, and to get perfect drainage. A prolonged operation, with the patient under the influence of an anesthetic, materially increases the danger of shock, and the recorded history of these cases shows that many die from immediate shock, or from the result of shock caused by an operation of from one hour to three or four hours, as has been mentioned by Dr. Montgomery. It is impossible for any one, it matters not how expert he may be in operating, to perform vaginal hysterectomy and use sutures, with any degree of speed. It is necessarily a loug and tedious operation. Not only is it long and tedious, but in the hands of experienced operators is far from being perfect in controlling hemorrhage. I believe Dr. Martin, of Berlin, has operated more frequently than any one else, and is very expert in using sutures and instruments. He has had fatal results from hemorrhage. But with the improved technique, where the clamps are used, the operation can be performed in one-sixth of the time, and hemostasis is nearly perfect. There is no

excuse for letting a woman die of hemorrhage from vaginal hysterectomy for cancer if the forcep-clamps are properly applied. It is no difficult matter to apply the clamps if one understands the technique. Having divided the vaginal wall, and dissected with great care the uterus from its anterior and posterior attachments, avoiding the ureters, a finger may be passed over and around the broad ligament on either side, and the clamp applied. There are a variety of clamps. This large clamp of Dr. Montgomery is certainly no easy one to apply. I do not see why he has made it so powerful. There is no necessity for it. Here is one (also devised by Dr. Montgomery) that I prefer; but this is larger than is required. The clamping surface is about the proper length, but the handles are too long and too heavy. About a year ago

I devised a hysterectomy clamp, which is manufactured by Tiemann & Co., that is not much more than half this size. It is bent in the handle upon the flat surface, so that when applied one handle lies on either side of the vulva.

The pressure of a large forceps for forty-eight hours may cause sloughing of the vagina or vulva. Any form of hemostatic forceps can be used to control the hemorrhage from the vaginal cut. There is no necessity for inverting the uterus and throwing the cancerous neck into the peritoneal cavity. No intelligent physician would operate for vaginal extirpation if the cancer has invaded any structure outside of the uterus, or if there is positive cachexia.

There is danger from imperfect drainage. It has been positively proven that the best results have been obtained by leaving the vaginal vault open. When forceps are used there is no necessity for packing the vagina with lint or gauze. I believe the future will demonstrate that it is not needed, and if not carefully used it may be absolutely harmful. It can do no good, unless to facilitate drainage. But with two or more forceps in the vagina drainage is good without it. And if you put in too much gauze it may obstruct the discharge or force it upward, and cause the death of the patient. I do not think it is necessary to wash out the vagina. It may do harm. If the vaginal opening is not closed, the water may be forced into the peritoneal cavity, and carry with it more or less septic or necrosed matter. If the discharge in the vagina only is washed out, what good does it do? In properly selected cases the immediate mortality of vaginal hys-

terectomy will be reduced below the present mortality of ovariotomy proper. The results of high amputation for cancer of the cervix, as reported by a gentleman in the East, and recently by a gentleman in Cincinnati, are not worthy of consideration. I pay no attention to them. I cannot conceive how any permanent results equal to the results of total extirpation of the uterus can possibly follow; and if permanent results are claimed, I am positive that there was an error in diagnosis, and that the disease was not malignant. The line of demarcation between benign and malignant growths is not easily defined by an experienced microscopist or pathologist. No man knows how high up the uterus the cancer extends. If the cervix is very much involved the cancer extends so high up that it cannot be entirely removed by high vaginal amputation. The reports of cases of high amputation of the cervix for carcinoma uteri, should not be considered in our decision as to the propriety of hysterectomy in properly selected cases.

Dr. Charles A. L. Reed, of Cincinnati, Ohio.—The question of vaginal hysterectomy in cases of cancer of the uterus, is one that I consider has long since been settled. I think that, beyond all doubt, the consensus of opinion to-day is in favor of total extirpation as against any partial removal of the diseased organ. Our results have been thoroughly well presented by Dr. Montgomery, and his statistical research deserves commendation; but his figures unfortunately refer only to primary recoveries. While it is true that all operations must find their first justification in primary recoveries, it is also true that all operations must find their final vindication in their ultimate results. I am sorry to say that, as to ultimate results, the paper presents relatively few figures. It is true that we sometimes hear of recurrence of the disease, but, notwithstanding this fact, the large percentage of primary recoveries, coupled with the period of immunity from recurrence, that can always be relied upon in cases of primary recovery, furnish ample justification for the operation.

My own experience with the operation has been limited to five cases —four primary recoveries and one death. One case, operated upon twenty months since, has had recurrence, the disease manifesting itself fourteen months after the operation. The patient has, however, spent two seasons very enjoyably on the Maine coast, and manages to maintain a fair state of health by submitting to an occasional curetting. In this case the good that has already been realized is ample justification of the operation. There was, however, a time when this very operation, in this very case, was denounced as unjustifiable. I submitted the scrapings from the case, before operating, to that able

microscopist, Dr. Thacker, who pronounced the disease sarcomatous. I again curetted the womb before beginning to operate, and did it in the presence of a number of able gentlemen, among whom was my distinguished friend, Professor Wenning. Yet at the time I submitted that specimen to the Obstetrical Society of Cincinnati the diagnosis was seriously doubted, chiefly because I had scraped off the malignant tissue down to the normal matrix. Of course time brought confusion to my distinguished critics, for, as I have stated, the disease recurred after fourteen months.

I would hardly know how to operate in these cases without Jones's speculum. This instrument is a self-retaining perineal retractor, that keeps its place perfectly, and gives the operator full command of the anterior wall of the vagina and of the field of operation. Its great advantage is that it can be used only with the patient on her back, the altogether desirable position in operating.

I think that with operators generally the clamp will take the place of the ligature; indeed, I think it has already done so. When I first started out to do the operation, I tried to follow the technique of Martin, but was forced to complete the operation with the use of the clamp. I have since used the clamp as a matter of choice. It has occurred to me, however, that the clamp is a possible source of danger, and I have been impressed with that fact by the one fatal case that mars my record. In that case the patient suffered great pain, complaining loudly of the clamps, and died in two hours from shock. Did not the clamps induce the excessive pain and the fatal shock? It is true that the clamp has the advantage of ease of application and of safety from hemorrhage.

The antiseptic tampon, or any other tampon, is not needed, and may induce mischief. If used they should be frequently changed, and frequent changes cannot but denude the vagina of its epithelium and produce great discomfort. This was precisely what I experienced in my first case. I have since left the canal entirely free, resorting once daily to bichloride of mercury irrigations. I must say that I cannot concur with my friend from Louisville, Dr. Wathen, that the vaginal canal should not be washed out. I do not think that the cautious employment of the irrigator, which I always use myself and never entrust to a nurse, is a dangerous procedure.

Dr. A. Vander Veer, of Albany, N. Y.—I desire to say a word or two in regard to Dr. Montgomery's paper—a paper, however, that covered the ground so thoroughly that there is not much more to be said. As I listened to Dr. Montgomery's report of cases there came to me a great deal of comfort, and I really found the statistics were

more favorable than I had previously supposed. I believe the operation will be limited strictly to cases of cancer. Up to two years ago I had a peculiarly unfortunate experience. I had operated on five cases by galvano-cautery. One of the cases I knew to be well four years after the operation, the other four cases were unfortunate in this respect: the patients did well for a few months after the operation, and yet the disease returned in all these cases, in five to six months, or nine months, and the depression that resulted from the return of the disease was pitiable; therefore I stopped doing the operation two years ago. In seven cases presented since two years, in only one did I advise operation and she absolutely refused. And yet, with the increased benefit from the operation, I believe that our patients will gradually come to that point, and submit to the operation more willingly in the future than in the past. In my own mind, in review of the operation, it seems to me that we get along with the forceps as well as with the clamps. I desire to ask Dr. Price as to the stitches he used in bringing the surface together in his supra-vaginal hysterectomies. (Answer, page 160.)

Apropos of the case presented by Dr. Carstens I wish to report the following case:

Mrs. R. E., aged twenty-nine, married four years, no children, native of the United States, and giving the following history: She was nearly nineteen years of age when she first began to show signs of menstruation; was never regular, suffered very much at such times, with a scanty discharge; and was treated for two years after her marriage by various physicians, all of them stating to her that they could not make out any cervix or opening to the uterus. The latter part of 1887 she was treated by a physician who examined her while she was menstruating, stating to her that he was able to pass a fine probe in at a point where the menstrual fluid seemed to escape. He dilated this opening and after that time she was more regular and suffered very little during the time of her monthly sickness. November, 1888, when the time arrived for her menstruation, she passed by, but had a slight discharge in December; after that she presented many of the symptoms of pregnancy, such as morning sickness, pain in her breasts, and other conditions. She appeared quite well until March 5, 1889, when she was taken suddenly ill with severe pain in the left inguinal region, her abdomen became very much distended, she vomited almost constantly, and suffered greatly for over two weeks. Her physician in attendance stated to her that she probably had some form of abdominal tumor, and that she must wait, taking of anodynes as seemed necessary to relieve her. I saw her April 10th for the first time, and on examination could make out an irregular tumor filling the pelvis and lower

portion of abdomen, the latter being larger than a woman at full term would present. The bowels were very much constipated, and the abdomen was very sensitive to the touch. She vomited very frequently and at times a dark greenish-looking substance. After two careful, thorough vaginal examinations with a speculum, I failed to discover any trace whatever of the cervix, and no depression in the mucous membrane into which I could pass the smallest probe, or any sign that would lead one to believe that there was any opening whatever to the cervix. By careful administration of small doses of calomel, followed by sulphate of magnesia, we were able to control the vomiting somewhat, and also to produce free movements of the bowels; and, though examination of the abdomen could be endured somewhat better, I was yet unable to satisfy myself as to the actual condition that might be present. She required large doses of morphine, both hypodermatically and by the stomach, to afford her relief; she emaciated quite rapidly and I advised her to enter the Albany Hospital, which she did on April 27th, informing her and her husband that an abdominal exploration would be necessary, and that I believed her to be pregnant, without doubt, but that there was some obscure growth which we could only learn of by abdominal section. She entered the hospital, and after careful examination an irregular mass could be made out to the left of what seemed to be the pregnant uterus. This mass extended up to a level with the umbilicus and somewhat back into the lumbar region. It was thought wise to aspirate first, as her condition was so exceedingly feeble after reaching the hospital. This was done, but no fluid whatever was obtained. Pulse ranged continuously from 120 to 140; temperature from 98° to 101⅘°, and vomiting almost continuously. Matzoon, beef extract, and beef peptonoids were retained only for a short time; bowels very constipated and moved with the greatest difficulty only by the use of an enema. She passed a fair amount of normal urine, which, on examination indicated a healthy condition of the kidneys. Hot applications were applied over the abdomen, but no improvement whatever took place. She gradually grew weaker, and the surroundings of the case were such, as to relation of family, etc., that I hesitated about taking the risk of an abdominal section. She died May 16, 1889, and at the autopsy was found to be about five months pregnant. By gently passing a probe from within the uterus downward, the neck was found, partially developed, and the probe passed into the vagina. The cervix was then dilated with the finger, demonstrating that had there been no other complication she could have been delivered at term. To the left of the uterus, forward from the broad ligament, was a solid tumor connected so that a pedicle

could have been isolated and ligated, the tumor being about eight inches in its long diameter, and six inches in its short diameter, firmly attached to everything—*i. e.*, intestines, omentum, and inner portion of the ileum and to the sacrum—completely obliterating the rectum by reason of its mechanical pressure. Had I made a section when she entered the hospital I have not the least hope in believing that I could have gone on and removed the tumor at that time, because of the extensive adhesions. The tumor was of the nature of a sarcoma, peculiar in this respect, that with the small round cells there was a distinct form of stroma, giving it a very solid, firm feeling. The case to me was a peculiarly knotty one. Had the diagnosis been made sufficiently early, and an abdominal section made at the time, I have no doubt that the tumor could have been successfully removed and the patient recovered, as in Dr. Carstens's case just reported.

Dr. Joseph Price, of Philadelphia.—The case reported by Dr. Carstens interested me much, because I have recently had two similar experiences. In the one case a woman eighteen months ago consulted a physician simply to engage his services for confinement, and called his attention to some pelvic discomfort. She was then about five or six months gone. He accidentally discovered a tumor filling the pelvic cavity. The cervix was pushed well forward against the pubes. He counseled induction of premature labor. He had considerable difficulty in inducing premature labor and emptying the uterus. In eighteen months she again conceived. They consulted me at the third month. I found a pelvic tumor—soft and low down. I reasoned that it was one of two things—a dermoid, or a pediculated fibroid gravitated into the left broad ligament. I counseled the removal of the tumor, as they were anxious to have a child. She was quite happy to have the prospects of being a mother. I incised the vaginal vault, and delivered a tumor about the size of a child's head, by introducing two fingers into the rectum and delivering it in that way. I transfixed and tied, and soon discovered that there was some of that treacherous fibroid tissue in the pedicle, and the ligatures would not answer. I tried, drawing the ligatures as tightly as possible, without making the second knot. I discovered it was still impossible to strangulate and control hemorrhage. I then applied hemostatic forceps and cut the tumor away. The operation was done a few days before leaving home. She was doing well at last accounts, and no signs of aborting. The following day I saw a patient, a healthy young woman, the mother of three children. The physician telegraphed me: "I have an extra-uterine on the right side. See me at once." I saw him that afternoon, and made a most careful examination. I found a small, painful tumor on the right side; two periods absent. The uterus

seemed too large for extra-uterine pregnancy, and I reasoned this was a small inflamed ovarian cyst. He insisted that he was correct. I urged its removal. I operated the next morning, and removed a small adherent ovarian cyst.

I have another object, Mr. President, in calling your attention to these cases. I have many times removed small tumors complicating pregnancy, and I have seen most excellent results. I am satisfied that puerperal fever is commonly due to traumatism, caused by small tumors. I examined a woman with a small tumor, and counseled its removal. She refused, and one year after I attended her in childbirth, and had the only case of puerperal fever I ever had. I am satisfied that many women have died of puerperal fever, so-called, that died of a suppurating or ruptured small tumor, never recognized before or after labor.

The case reported by Dr. Carstens was an interesting one, and the course pursued was assuredly the wise one. I know of no other means of managing such a complication. I scarcely agree with him in regard to applying the ligature and removing the tube. If the tubes have anything to do with menstruation or metrostaxis, surely it is wise to leave them intact, and not apply a ligature about them, particularly if they are healthy. It may favor abortion. He hesitated to remove the other tube and ovary. There was no reason in that case to unsex completely a childbearing woman, with a bare possibility of a recurrence on the other side. It would scarcely be justifiable.

The numerous deaths complicating labor, and soon after labor, on record are sufficiently numerous to impress us with the importance of the earliest possible interference. Only recently I saw an enormous tumor in a woman just delivered of a child, and they were treating her for puerperal fever. I urged immediate removal. The physician fixed the hour for the third or fourth day after—that he might have time to read the subject up, I presume—and telegraphed me on the next day but one that his patient was much worse, and asked me to meet him at three o'clock; but his patient died at half-past two. This demonstrates the importance of promptitude. Now, in regard to Dr. Vander Veer's inquiry about the stitches, I prefer silkworm-gut, or fine Chinese pure twist silk, to all other materials for abdominal sutures.

Dr. Joseph Hoffman, of Philadelphia.—To go back to the subject of supra-vaginal treatment. I have one thing first to say about vaginal hysterectomy, relative to the very decided opinions Dr. Wathen suggested about the danger and inadvisability of vaginal drainage. It is marvelous to me that any man who recognizes the necessity of drainage in simple abdominal section can, in the presence of a drainage-tube like the vagina, see so great an amount of danger and speak so strongly

against it. The great danger Dr. Wathen has presented to us does not exist and there is no use considering it. It would be so if there was no such thing as a return catheter. The danger of washing any dirt and pus into the abdominal cavity is absolutely nothing. We do not need to use a strong disinfectant solution; pure hot water, or at least borated hot water will answer.

A word about the stump in hysterectomy. Mr. Keith says that it has been the foundation for a great deal of sentiment in regard to the external treatment of the pedicle—that the plan is unsurgical. Surgery does not mean cosmetic adornment either of the face or abdomen. It means such application of principles as will give us results.

The word ideal: What is ideal? I do not know in surgery what ideal means, unless it be adaptability to the end desired. If a clamp will give us better results than a beautifully stitched stump that is allowed to drop down into the abdomen, I do not know what is the use of tying. These so-called modifications are often no more than bids for boldness. The beauty of the clamp or the wire is, that it absolutely controls hemorrhage. The difference in the structures to which the ligature is applied, from those met in simple ovariotomy, is sufficient excuse for the different ways in which we attempt to control hemorrhage. The ligature that will hold an ordinary pedicle in ovariotomy, will no more hold the strain of a hysterectomy stump, than an ordinary water faucet will hold the force of Niagara. What we want is the power and force to control the resistance, with no danger of hemorrhage.

Dr. Wathen.—Mr. President, will you allow me to make a correction? If Dr. Hoffman had listened carefully to what I said about it, he should know that in no sense did I condemn vaginal drainage, but emphasized my belief that vaginal drainage through a tube is often imperfect. Vaginal drainage was claimed by me to be the thing *par excellence* in hysterectomy, and that the secret of success was in perfect drainage. I referred to the possible danger of washing out the vagina; it does exist until the opening in the vaginal vault is closed by adhesion. Then, of course, there is no further necessity for the douche, since it could do no good except to cleanse the raw surface protruding in the vagina. Any one who understands the laws of physics should know that water injected into a vagina with open vault would probably get into the peritoneal cavity; this is positively true if the water is thrown up far enough to cleanse the upper part of the raw surface, and unless this is done the injection can do no possible good in preventing septic infection. With a woman on her back the current of drainage is from the abdominal cavity if we interpose no obstruction to its flow. I do not believe that injections do any good, but

rather injury by forcing necrosed or septic matter into the peritoneal cavity.

Dr. Hoffman.—Dr. Wathen may understand physics perfectly, but he does not appear to understand the syringe.

Dr. W. W. Potter, of Buffalo.—In the discussion yesterday, and again this morning, I noted the term *ideal* used in connection with abdominal operations. The technique that affords the best results in the saving of life, is, it would appear, a nearer approach to ideal surgery, even though it falls short in its anatomical perfection, than that which aims at the latter while yielding a higher death-rate.

This, I believe, is substantially Dr. Hoffman's position, and its strength must be admitted.

The papers of Drs. Montgomery and Price are upon subjects that possess great interest at this time, and their presentation has been most opportune. It is expedient, therefore, that the discussion shall not be limited by technical rules or sharply defined boundary lines of debate.

The remarks I shall offer upon the first paper will be confined to the vaginal total extirpation of the *cancerous* uterus; for this, I believe, is the real field of the operation. The cancerous uterus has, until very lately, been considered the *bête noir* of surgical art; nor is it easy to conceive how it could be otherwise, if we are to judge by the results obtained from all methods of treatment. It was not until the recent achievements of Freund, Billroth, Czerny, Schroeder, and a few others were published, that new hope was inspired in this heretofore almost hopeless field. The work of American operators has been of a nature sufficiently flattering, to justify the assertion that the operation is now established as a legitimate procedure, and that the future will record numerous lives saved, that were previously abandoned to a tentative management that was as unsatisfactory in practice as disastrous in results.

The technique as practised by Martin and Fritsch has been found so difficult to apply in this country, that most Americans follow the lines laid down by Dr. Montgomery in his operations. The saving of time by the application of clamps to the broad ligaments to secure the vessels, is of considerable importance. If these patients do not become septic, and the operation is not otherwise complicated, they make prompt recoveries; nor do they lose their sexual feelings or feminine form even after removal of uterus, tubes, and ovaries.

It is well to remember that, in the selection of cases, it is nearly useless to make the operation when the disease has extended beyond the

confines of the uterus itself; therefore, when circumjacent carcinomatous infiltration can be detected beforehand, the operation should be declined.

The treatment of the pedicle in supra-vaginal hysterectomy, as set forth by Dr. Price, must meet the general approval of observers in this country. The extra-peritoneal treatment of the pedicle has, by the law of natural selection, come to be the accepted method here. The chief sources of danger from the pedicle are hemorrhage and sepsis, and these may be difficult to prevent if the pedicle should happen to be, as it frequently is, short and thick. In these and other respects the stump differs widely from the ovarian pedicle, hence it is difficult to understand how they can be regarded as identical, or even analogous, in the principles that should govern their management.

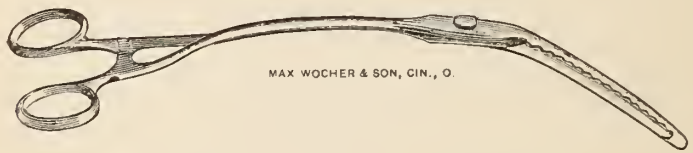
If one simply examines the results obtained by Bantock they would seem sufficient to settle the question of the treatment of the pedicle. Two years or more ago he published sixty-two cases—fifty-seven treated by the extra-peritoneal, and five by the intra-peritoneal method. Of the former forty-five recovered and twelve died; of the latter one recovered and four died. After making that report he declared he would never treat the pedicle by the intra-peritoneal method again. I am aware that Bantock has even improved these statistics by the addition of his later operations, but as I have not the exact figures at hand these will answer for the purpose of illustration. A man who has had this experience of Bantock has a right to speak for the chair, and, though in Germany the method of Martin may prevail, here in America, where such uniformly better results obtain, the extra-peritoneal treatment with the serre-nœud must lead until something better is evolved.

Dr. Price has described the technique of the method so concisely and well, that I need not enter into that part of the subject.

The interesting case reported by Dr. Carstens goes to strengthen the view that even the most formidable operations may be made within the abdomen during pregnancy, without interrupting the progress of gestation or preventing subsequent delivery at term. This corresponds with my own experience, and, since he has been kind enough to refer to the case of double ovariotomy during pregnancy that I reported to the Association last year, permit me to state that both the mother and infant in that case are now interesting examples of robust health.

Dr. Rufus B. Hall, of Cincinnati.—My remarks on the subject of vaginal extirpation of the uterus will be confined more particularly to the clamp, with reference to securing the broad ligament. There are certain difficulties to overcome in vaginal extirpation that pertain to the operation, particularly when the ligature is used, as in Martin's

method, that must be surmounted before the mortality of the operation can be reduced to the minimum. Of course we practically agree that the clamp is the substitute for the ligature. There are many different clamps for securing the broad ligament, none of which is the ideal instrument. Some are good and some are defective. In reference to the one displayed yesterday, criticised by Dr. Wathen as too heavy—that is not the greatest objection to it; there should be certain curves to the instrument that conform to the parts, to make it more easy of application. Some time ago I devised a clamp for that



purpose which I wish to show to this Society. The clamp is bent first at any angle—there are two side angles—and it has a lock like an obstetric forceps, making it exceedingly easy of application.

I only want to say one word in reference to supra-vaginal hysterectomy. I cannot find words strong enough to endorse the method spoken of by Dr. Price yesterday—closing the abdominal wound below the wire, snugly around the stump.

Dr. Montgomery (closing the discussion).—Before proceeding to reply to the discussion of my own paper, I wish to make a few remarks on the papers of Drs. Carstens and Price.

I cannot too highly commend the course pursued by Dr. Carstens in the case reported by him. The operation was certainly indicated in that stage of pregnancy. As has been said, it is well known that the tumors grow as rapidly during pregnancy as at other times. Indeed, in many cases, the increased activity of the pelvic circulation engendered by pregnancy enhances the growth of any pelvic tumor. The operation is one, then, often indicated, and in many cases absolutely demanded. From the weight of a fibroid of the ovary we would expect it to be depressed in the pelvis, and thus become an obstacle to delivery. If left to the completion of pregnancy, there would be but one of two things to be considered—either the destruction of the fetus, or Cesarean section—so that in such a case the early operation would be preferable.

In a paper read before the State Medical Society of Pennsylvania, some two years ago, I presented a number of cases, in which I was able to show that the existence of pregnancy seemed to have but little

influence upon the mortality of the operation. The results were practically as good when done during pregnancy as when it was absent. On the other hand, the operation does not always interfere with pregnancy.

As Dr. Price has well said, in his paper upon supra-vaginal hysterectomy, the first indication in the performance of an operation is to save the life of the patient, and those procedures are preferable which are most frequently followed by recovery. In the majority of cases the intra-peritoneal treatment of the stump is attended with more danger than the extra-peritoneal. One objection to the extra-peritoneal treatment is the fact that with the stump external we have more or less traction upon the abdominal walls, resulting in an indrawn belly. Again, it is difficult to keep the wound antiseptic, and, after the dead portion is sloughed off, we have a considerable depression to be filled up with granulations, requiring a prolonged convalescence. For these reasons operators naturally desire to secure the stump in other ways.

The uterine tissue affords a poor material for ligation, as it is erectile, and after the ligation of the stump and removal of the mass, the tissue external to and included by the ligature shrinks, permitting hemorrhage to be renewed; and this hemorrhage may be exceedingly grave before it is indicated by the condition of the patient, and will require a reopening of the wound to secure the bleeding vessels. In a case I operated upon a few years ago, I endeavored to secure the stump by making a flap-shaped amputation, and bringing these flaps and their peritoneal edges together by sutures. After the removal of the elastic ligature, however, there was so much hemorrhage that it was necessary to bring up the stump and control it by the clamp at the lower angle of the wound. Other methods have been suggested; as ligaturing the stump in small portions, as done by Marcy with excellent results. Another is the ligation of the uterine arteries on either side of the stump, thus lessening the amount of blood sent to it, while the raw surface is covered with peritoneal flaps. This seems to me the most feasible method of treating intra-peritoneally. By the intra-peritoneal method we will be able to shorten very materially the period of convalescence, and come nearer to ideal surgery.

I have to thank the Fellows for the very generous consideration they have given my paper. The gentleman opening the discussion spoke of the unnecessary weight of my clamps. I cannot say that I am particularly wedded to them. I simply present them as an evidence of a struggling effort on my part to devise a means to control hemorrhage, and have found them very serviceable. Their weight I do not consider as necessarily an objection; the constricted tissues are more

likely to be retained in a fixed position, and the vagina is more depressed, affording better drainage. They are not permitted to remain long enough to endanger the tissues from pressure. I have been exceedingly pleased with the ingenious clamps of Dr. Hall, and think them in some respects preferable to my own.

The gauze tampon is also criticised, but it should be understood that it is not sufficiently large to round out and distend the vagina, nor should it be carried up between the edges of the peritoneum. Its introduction promotes drainage by capillary action. It may be permitted to remain until the fourth day. The clamps should be removed at the end of twenty-four, or, at most, thirty hours, allowing the gauze to remain for drainage two or three days longer. After this, irrigation may be practised. It is unattended with danger, as by the third day the peritoneal surfaces have become firmly united. If an antiseptic is used, I think the acid sublimate is preferable. I fail to see how the clamp could be justly blamed for the death in the case cited by Dr. Reed. There is a certain amount of shock that results from the operation, but I do not believe it is much greater from the application of the clamps than in the use of the ligature. It seems to me the time saved more than compensates for any possible deleterious effects of the instruments.

Dr. Price (closing).—I desire to allude, first, to Dr. Wathen's remarks. He gets the vaginal vault full of fluid and dirt, and then condemns any means of irrigation or drainage. I know there are no conduits or sewers toward the diaphragm; by irrigation it would be impossible to wash it up into the abdominal cavity. I scarcely understand his philosophy of either irrigation or drainage, and his counsel is not to be followed if you prefer good results. Dr. Potter has not done Bantock justice in quoting his figures. Seventy-two, or seventy-four, with a mortality of twelve, with his supra-vaginal extra-peritoneal hysterectomies, including two to four enucleations since. The five that he dropped, losing four, are correct.

A very few words in regard to treating the pedicle in hysterectomy. The conditions are wholly different; the structures are entirely different; nor are you to use the history of ovariotomy as an argument in dropping the pedicle. The shrinkage is very great, and not to be controlled. I lately began with a stump as large as my wrist, and finished with one as large as my thumb. I have never seen an operator yet, capable of managing such a stump with a ligature. The statistics, and we must largely be governed by them to save lives—the results of extra-peritoneal methods, the Bantock or Keberle method, the nœud method—are about ten to fourteen per cent. better

than the intra-peritoneal method. Schroeder operated over a hundred times, with a mortality varying from twenty-five to thirty-five per cent., with dropping the pedicle. Martin's results are even worse. Some of the recent reports from Germany are still worse. The results have gradually improved in the hands of men who have confined themselves to the extra-peritoneal method after giving the other a trial. I will allude to the results of Mr. Tait. Four years ago he condemned the operation, and went so far as to say it was a murderous procedure. I presume he meant whether done by either method. I said the results are about between ten and fourteen per cent. in favor of the extra-peritoneal method. Keith used the extra-peritoneal method, I think wholly, and lost three out of thirty-eight or forty. Bantock's results have improved since his series of seventy-two with a loss of twelve. Tait had a run of thirty-two without a death. And at present in non-malignant tumors the results are about as good as in ovariotomy. In short, they are better. Keith said the result would never be as good. I have known a number of beginners to have three, four, or even five, without a death. They had no such results in the first five ovariotomies. The conditions are wholly different. In speaking of this subject I would not have you understand that we are removing every fibroid we see. Not so; there are very few hysterectomies done. I presume operators are doing operations in one case out of twenty that they see; in badly adherent tumors only, with pressure disturbance, kidney disturbance particularly. We are not quite bold enough with a large, non-complicated tumor in a healthy patient. The mortality would be very low indeed in the operations when done in a perfect manner. It is not a simple procedure; on the other hand, it is a terrible operation, and it requires a good deal of courage and a good deal of endurance to live through one.

LIGATURES AND SUTURES.
WHAT MATERIAL SHALL BE USED?

By CLINTON CUSHING, M.D.,
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Ligatures and sutures play so important a part in the daily work of the surgeon and gynecologist, that a consideration of the advantages and disadvantages of the various kinds that have been used may prove of service.

Doubtless, nearly all of us finally arrive at a conclusion in favor of some special variety, based upon individual experience and habit. It would appear to me that there is as yet no material used for sutures and ligatures, that is equally useful and applicable at all times and under all circumstances. If this proposition is true, it is in order to discuss when and where to employ certain of the kinds in general use, and the methods of their preparation. The following list embraces all that I am entitled to an opinion upon from personal observation:

Catgut,
Silkworm-gut,
Silk,
Silver wire,
Elastic ligature.

For the past three years I have prepared with my own hands all the catgut that I have used, and a large experience with it has led me to the conclusion that it is the best obtainable material in certain cases of plastic and abdominal surgery. I purchase from the wholesale dealers in musical instruments several boxes of the three sizes of catgut strings used on the violin. I get the best quality. They are placed in a large, open-mouthed bottle filled with sulphuric ether, and allowed to remain for forty-eight hours. When removed they are

very nearly white, as the ether removes from the catgut all the animal oil. They are then placed in a mixture of three parts alcohol and one part juniper oil, with the addition of three drachms of hydronaphthol to each quart of the fluid. The strings are allowed to remain in this mixture for ten days, when they are ready for use. The are semi-transparent in appearance, are perfectly flexible, and exceedingly strong.

The largest size, or D string of the violin, I use for ligating the pedicle in ovariotomy, and for repairing the perineum. The A string, or middle size, I use for repairing the cervix, and for a buried suture either in the perineum or in the abdominal wall. The E string, or smallest size, I use for ligating adhesions and bleeding vessels in the abdominal cavity.

The D and A strings do not become absorbed by the tissues in less than from seven to nine days, as can be easily demonstrated by observation.

I have also used the A string for stitching together the muscular and peritoneal surfaces of the cervix after hysterectomy for a fibroid tumor. The indications for using catgut as a ligature for the pedicle after the removal of the tubes or ovaries, will be gone into more fully when speaking of the silk ligature. For the buried suture, in either the perineum or the abdominal wall, the catgut prepared in this manner is probably the best. For repairing the cervix I have found it more satisfactory than any other material, as it does not cut out of the tissues, and holds sufficiently long to secure union. The only disadvantage thus far noticed is that occasionally a small fistulous tract remains along one of the suture holes.

The method of closing the cervix with catgut is exceedingly simple and very rapid. A strong double knot is tied in one end of a piece of gut about eighteen inches long; the opposite end is frayed out with the back of a knife until perfectly soft and flexible; this is then threaded in a strong needle with a large eye; this triangular-pointed needle is introduced in the usual way at the upper angle of denudation, and drawn until the knot presses against the mucous membrane at the point of introduction of the needle, and then a running or whip-stitch is taken over and over, taking up a goodly amount of the

tissue, until the entire line has been closed. I then go back about two stitches, and take two stitches through the already closed part, and thus, by making a small running noose with the last stitch, the catgut is prevented from slipping.

In the perineum, after the denudation in the usual manner, about four sutures are introduced in such a fashion that when they are tied it lifts the pelvic floor upward. The four sutures are then tied with three firm knots, and the ends left an inch or more in length, which prevents the knot from untying or slipping. I use for this purpose a very thick and rather short darning-needle, which is the only needle I am able to obtain with a sufficiently large eye to carry the heavy catgut; the suture material in this case, as in the other, being frayed out at the end with the back of a knife in order to make it soft and pliable. The results in my perineal operations thus far have been all that could be desired in quite a large number of cases.

The advantages of this material in repairing the perineum are that, in the first place, the catgut does not tend to cut out, on account of its size; in the next place, it fills the track made by the needle perfectly, because as it becomes softened it swells; in the next place, it apparently does not tend to become septic, as I have not seen any abscess or any noticeable collection of pus about the track of the stitches; and lastly, it does not require the separation of the parts and the worry and anxiety to the patient when the stitches are removed, that must take place where silver wire, or silkworm-gut, or silk is used.

Where the perineum and cervix are both repaired at the same sitting, the advantage of catgut for the cervical operation is very decided, because, however well the perineum may unite, it certainly must be considered a detriment to put it upon the stretch with the speculum during the first month in order to remove the stitches from the cervix, where silver wire, or silk, or silkworm-gut has been used; and it is true that quite a large proportion of women who require an operation for laceration of the perineum, require also an operation for laceration of the cervix.

The smallest, or E string, is sufficiently strong to ligate safely and successfully almost any bloodvessel in the body,

because if a vessel has been thoroughly occluded for one week it may be considered safe, unless the vessel itself should be badly diseased.

Olshausen, who has written one of the best books on ovariotomy with which I am familiar, says:

"The objections to catgut, that it slips easily, that it is impossible to pull it tightly, and that the knots will loosen, are not justified if the ligature is properly made—that is, with solid, thick, or double threads; if it is drawn firmly, and under vibrating movements of the hands, is knotted three times, the ends in front of the last knot are left long, and a broad mass of tissue allowed to remain."

In another place he says:

"What becomes of the ligature material after an ovariotomy? This depends on circumstances. Carbolized catgut is finally absorbed in the peritoneal cavity, as it is in other living tissues, but it seems to me very probable that the absorption occurs more slowly in the peritoneal cavity than in other tissues. In eleven autopsies in cases of ovariotomy in which the pedicle had been ligated with thick catgut, I found the ligature perfectly firm and unsoftened, although death had not occurred in six cases until the sixth to the thirteenth days."

J. Greig Smith, in his recent work on *Abdominal Surgery*, says:

"As material for ligature, there is no strong objection to catgut. I have used it and nothing else in more than twenty ovariotomies, and find it perfectly reliable. Its drawbacks are, the trouble necessary for its perfect preparation, and its tendency to deteriorate by keeping; such drawbacks being, in my opinion, of sufficient weight to justify its being displaced by the more handy and equally trustworthy silk twist."

I am convinced that surgeons who have failed with the use of catgut have used it of too small calibre, or have trusted to specimens found in the shops—samples, perhaps, of unknown age.

There are no needles in the instrument shops suitable for the use of heavy catgut, and I have been compelled to use large darning needles for the perineum, and to have needles especially made for the cervix. These were made from large-size curved needles broken off an inch and a quarter from the eye, and the broken part ground to a triangular point.

The treatment of the catgut with the ether, by extracting all

the animal oil, renders it antiseptic. Were this not true, the ten days' immersion in the alcohol, hydronaphthol, and juniper oil would most certainly do so. The juniper oil renders the gut sufficiently soft and flexible. I believe it to be a mistake to place the animal sutures in corrosive sublimate solutions, as they are thereby rendered more fragile. The catgut should be used direct from the solution of alcohol and juniper oil, and not put into water before using, as the water makes these ligatures soft and slippery, and, hence, difficult to handle.

Dr. Henry O. Marcy, of Boston, uses an animal ligature made from the tendinous part of the kangaroo's tail, and claims excellent results therefrom. Fibres from the leg-tendons of the moose have also been used. These sources of supply, however, being limited and uncertain, the probabilities are that our animal ligatures in the future will be the catgut of commerce.

Dr. Nathan Smith, of Connecticut, in 1821 used as ligatures for the pedicle in ovariotomy, strips of leather cut from a kid glove. The pedicle was dropped, the abdomen closed, and the patient recovered; and it has occurred to me that fine strips of buckskin, properly prepared, as I prepare the catgut which I use, might make a most admirable ligature for the pedicle in an ovariotomy, for the reason that it is softer and easier to handle than catgut, does not cut the tissue so much in tying, and will resist absorption longer than catgut, but will probably be absorbed much more quickly than silk. At a future meeting I will give the Association the result of my experiments in this direction.

Silkworm-gut has qualities that are possessed by no other material—that of being absolutely unirritating to the tissues in which it is imbedded, and non-absorbable; at least, for a long time. I believe it to be the best material for closing the abdominal wall after an abdominal section. No stitch-hole abscesses have occurred in any of my cases where this material has been used. It is also an excellent material for perineal sutures. I formerly used it frequently, and with satisfaction. Instead of tying it and leaving the sharp ends to prick and annoy the patient, I slide over the two ends of the stitch a perforated shot in which has been tied a loop of strong black silk an inch in

length. When the parts are approximated the shot is run down to the perineal surface and clamped firmly; then the ends of the stitches are cut off on a level with the surface of the shot. Now, when the sutures are to be removed, the loop of black silk enables one to draw the shot up so as to make it easy of access, in order that one side of the stitch may be clipped.

The cervix can be united with this same material and in the same manner, and as the material is not in the least irritating the suture can be left *in situ* for several weeks; but the operation is not so rapidly or easily done as with catgut.

Silk thread is more generally used by surgeons for sutures and ligatures than any other material, on account of its ease in handling, its non-absorbability, and its strength. These are, undoubtedly, advantages, but it has its disadvantages in being porous, and therefore easily absorbing secretions which undergo decomposition and set up local infection. If the silk is first made absolutely aseptic, and the ligature is enclosed in tissue or in a cavity that is also aseptic, no better material could be desired; but these conditions are very different on the surface of the body or in the mucous canals, or in the peritoneal cavity which has been flooded with pus from a pyosalpinx that has been ruptured during its removal—an accident that occurs frequently in the hands of all operators.

Silk, then, for ligatures in the peritoneal cavity where no pus or infection exists, is the best; but if the case is one requiring the use of the drainage-tube, catgut should be used. The reasons, it seems to me, are exceedingly simple. If suppuration occurs from any cause, whether imperfect cleansing of the peritoneal cavity, or infection introduced through the drainage-tube, and the ligature material of silk becomes involved, the probabilities are that a fistula will remain until the ligature comes away, either forming the nidus for an abscess which opens into the rectum or the bladder, or discharges through the opening left at the site of the drainage-tube. The ligature ultimately is thrown off and the case recovers.

I doubt not there are few who have had much to do with abdominal surgery, especially in the removal of the Fallopian tubes in cases of pyosalpinx, but have had this unfortunate

experience of a fistula being left after the operation; and it is probable that this fistula was due to the existence of an infected ligature in a considerable proportion of cases. Twice during the past year I have been forced to enlarge the opening left by the drainage-tube and remove the ligature from the pedicle, in order to secure the healing of fistulæ.

In a recent discussion before the Obstetrical Society of Philadelphia, Dr. Howard A. Kelly says:

"I have known cases of infection of ligatures from a tube left in for a protracted length of time. I have frequently had ligatures sent to me by patients. In all these cases the fistulæ, which have persisted for weeks or months, have healed when the ligature has been rejected."

Dr. Goodell says:

"I have on several occasions fished ligatures out of a fistulous tract, and thus cured it. I am satisfied that one patient, on whom I performed ovariotomy a year ago, and who is suffering from a fistula, has a ligature at the bottom of the tract."

Several other members of the Society also cited one or more cases of fistula following abdominal operations, that failed to heal until the loop of silk used in tying the pedicle had come away.

The argument, it seems to me, with our present light is easy of solution. In a simple case of ovariotomy where no pus exists, or there is no need for a drainage-tube, silk, properly prepared, is the best material. If, on the other hand, it is necessary to leave a drainage-tube in the cavity, or the cavity of the peritoneum has been infected with pus, catgut should be used, for the simple reason that it will disappear by absorption in ten days, and will not thus be a cause of fistula or abscess.

There is a strong feeling in the minds of nearly all that silk is the safest material for ligature in ovariotomy, but I doubt not that properly prepared catgut of the calibre of the D string of the violin is strong enough and safe enough for any pedicle, however large.

I have had made at the silk factory at San Francisco a kind of heavy silk for the pedicle in ovariotomy cases, which seems to me to possess some advantage over any that I have seen. It is made of the best quality of Chinese silk, thoroughly washed

and extremely soft; it is very loosely twisted, and when tied applies itself smoothly to the parts without cutting; the knot does not slip, as is the case with the harsh and tightly twisted silk found in the shops. The variety that I saw used in Great Britain by Keith, Tait, Bantock, and Thornton, is made of unwashed silk with the natural gum still in it. It is harsh, twisted very tightly, and under the finger feels like coarse linen. This when tied acts almost like a piece of wire, and the knot tends to slip much more than it does with the soft and loosely twisted thread.

I herewith present to the Association a sample of the silk made here. The silk used for ligating vessels is the kind sold in the dry-goods shops on spools, and marked "double E." It is very strong, and much cheaper than that bought in small hanks at the instrument shops.

In injuries of the bowel, and in a resection of the bowel for stricture, I have always used for uniting the cut portions of the gut, fine sewing silk, and I think it is generally agreed that no material is so satisfactory as this for repairing a wound of the intestine.

I prepare the silk by first winding it loosely on a wooden reel. This is then boiled in a saturated solution of water and hydronaphthol for half an hour. It is then placed in absolute alcohol containing hydronaphthol, for twenty-four hours. It is then wound upon spools and is ready for use, the spool being dropped into a saturated solution of hydronaphthol and water each time before using.

Silver wire I use less each year. For some years I have used it only in cases of vesico-vaginal fistula, but I doubt not silkworm-gut would be equally good material in such cases. Its advantages of being unirritating to the tissues and easily made aseptic, are qualities which hold equally good of the silkworm-gut. Its disadvantages are, that its introduction is attended with more difficulty than the sutures that have been already mentioned, on account of its stiffness, as we must first introduce a loop of silk and afterward draw the wire into position; whereas, with the silkworm-gut it can be threaded directly into the eye of the needle and placed *in situ* more easily and more rapidly. Furthermore, the silkworm-gut is less costly.

It has seemed to me, too, that silver wire tends to cut out of the tissues more readily than the silkworm-gut.

The elastic ligature I have only used to surround the stump in amputation of the body of the uterus for fibroid tumor. Where the stump is treated extra-peritoneally the elastic ligature has seemed to me to have many advantages over other methods of controlling hemorrhage; but my success of late in the treatment of the stump according to the plan of Schroeder, by ligating the principal vessels at the side of the cervix, excavating the surface of the stump and suturing first the muscular and afterward the peritoneal coats together with heavy catgut and closing the abdomen, have been such that I have seldom used the elastic ligature. Olshausen, however, has applied it to the pedicle in ovariotomy in a large number of cases, and he claims with good success; and he has demonstrated by subsequent examinations that the rubber ligature becomes encysted and does no harm. Of this, however, I personally know little or nothing

A FEW CONSIDERATIONS ON PERITONEAL EFFUSIONS AFTER INTRA-PERITONEAL OPERATIONS.

By WILLIAM H. MYERS, M.D.,
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We have been taught to consider the presence of serum, or the effusion of lymph, as effects or products of inflammation.

Diseases produced by the effusion of serum are:

Hydrocephalus;
Hydro-pericardium;
Hydro-thorax;
Ovarian dropsy;
Œdema.

"The effusion of serum, except as the lowest degree of inflammation, is probably a rare event."—*Paget.*

The late Prof. S. D. Gross, in speaking of the presence of serum in the peritoneal cavity, says: "I have long been of the opinion that inflammation is indispensably necessary, even in chronic dropsies." I shall not attempt to sustain nor controvert his statement, but leave you to decide its scientific value. Here I shall only add that it may be important to remember the rapid exudation of serum in peritonitis, filling the abdominal cavity in a few hours, without the usual phenomena of inflammation, but always attended with intense thirst. Such cases are usually of traumatic origin.

Diseases resulting from the effusion of coagulable lymph are:

Hepatization of the lungs;
Closure of the trachea, in croup;
Strictures;
Adhesions;
Strangulation of the bowels.

These effusions of serum and lymph are always met with in

peritonitis, frequently complicating and often defeating our best devised plans of treatment. We call them:

Serous;
Sero-fibrinous;
Purulent.

These distinctions are based upon the character of the exudation. Fibrinous exudation refers to the separating of lymph from the blood, and, when applied to peritonitis, to depositing it upon the free surface of the peritoneum. The rapid formation of lymph in the inflammatory process attracted the attention of S. D. Gross in 1840. In his experiments on dogs, he found that, within a very few hours, bowels became extensively adherent to each other.

In the adhesion experiments made by Prof. Senn, he ascertained that adhesions are formed between the peritoneal surfaces in six and twelve hours, which effectually resist pressure from within outward.

I am of the opinion that a much shorter period is required for perfect union to take place, than is stated above. I believe that, after incising the peritoneum quickly and with a sharp instrument, the union is completed within a few hours. When the blood ceases to flow after an incised wound, exudation invariably follows, and the surface becomes glazed with plastic lymph.

The conditions that determine the production of one or other variety of lymph are, according to Paget:

1. The state of the blood.
2. The seat of the inflammation.

He assures us that he could usually guess accurately, from an examination of the fluid in a blister, the tendencies of the inflammation—to adhesive exudations or of a suppurative character; in the highest health—an exudation containing the most perfect unmixed fibrine; in the lowest health—by the production of the most abundant corpuscles, and their near approach to the character of pus-cells. This doctrine is distinctly enunciated by Copland, as follows: "The quality of the fluids effused depends upon the state of the vital power; when the former is energetic, then the effused fluid abounds in coagulable lymph."

Rokitansky asserts that the products of the inflammation exist, at least in part, in its germs, pre-formed in the whole blood, and that the greatest and most marked differenees of inflammation are manifested in its produets.

Here let us pause and ask the question: Is it true that these differenees are only one of degree—that they are dependent upon the intensity of the inflammatory aetion?

The late Prof. Mütter taught that the inflammation must not be too high, or we have pus. The same thought was advaneed by Prof. S. D. Gross, who said: "The presence of pus, as a rule, is denotive of a higher grade of excitement than a mere deposition of serum and plastic matter." His pathology was based upon the theories of Bennett, Cohnheim, Virchow, and Waller, that the white blood-eorpuscle is identical with the pus-cell, and would so eonsider it, found outside of the proper blood channels. They also affirmed that the same anatomical element has been variously denominated a white blood-eell or a pus-cell, aecording to the loeality in whieh it has chaneed to be discovered.

It will be in aceord with the scientific tendeney of the present pathology to divide inflammation into simple and infeetive. The latter depends upon the presence of specifie mierobes rather than upon a high degree of aetion, and they are the only and essential cause of suppuration.

If it be true that the growth and activity of mieroörganisms are dependent upon the media or soil, then the nearer the patient's health approaehes the normal standard, the less danger of invasion, as healthy, living tissue possesses eertain powers of resistanee. Life, in faet, may be defined as a power eapable of resisting deeomposition. It is the great antiseptie. Lister suggests that the tissues of a healthy living body have a power of eounteraeting the energies of baeteria in their vieinity and preventing their development—vitality their poison, non-vitality their food. If their invasion is undertaken in insuffieient foree, or upon an animal in robust health, they are refused a foothold, and expelled; or, if they have seeured a lodgement in the tissues, they are laid hold of and digested by them; this faet has been repeatedly observed and demonstrated by Cameron, Lister, and Billroth. They have also proved by

experiment that an undisturbed, healthy coagulum in the vicinity of living tissues will resist the development of putrefactive bacteria, even when present in a highly concentrated form. In illustration, let us apply these statements or facts to surgical procedures, and they will explain the success which has attended important operations without antiseptic precautions; notably does this apply to ovariotomy.

In 1874, I removed an ovarian tumor from a patient æt. thirty-six years. The tumor weighed forty-five pounds. From my notes of the case, I read that the rebound to health was rapid and complete. No antiseptic precautions were used except cleanliness. In this case, I now believe, the recovery was largely due to the high vital energy of the peritoneal surface.

We all know how rapidly a wound in the peritoneum may heal, by the peopling of the lymph in the wound with vigorous new living elements; for the formation of lymph proceeds more rapidly in proportion as the wounded tissues are in a more vigorous condition. Hence, the power of organizing blood-clot or lymph to resist the development of putrefactive bacteria. This high vital endowment of the peritoneum is of wide application in abdominal surgery.

Life and putrefaction are not correlative, but antagonistic; and, in proportion as we utilize and economize the attributes of life, we will find ourselves independent of those changes which are inherent to decomposing organic matter.

Dr. Antonine Magnin has demonstrated that, if the animal's health be impaired, organisms may be found in the blood, tissues, and exudations. Watson Cheyne has found that microorganisms require the condition of rest for their development, and that they will not multiply in the circulating blood.

A predisposing cause in disease may be defined as a cause which, whilst not producing disease itself, renders more effective the exciting cause; and under this head we must include the environment of the patient, shock, loss of blood, and depression of vital powers. This permits the entrance of the living excitors of inflammation, microörganisms, into the body. When the health is unimpaired, no living organism can penetrate into the blood; or, if they do, they soon die.

If it be true, as stated by Rokitansky and Paget, that the product of the inflammation exists pre-formed in the whole blood; that the exudations correspond with the patient's general health, then I believe, in all gynecological operations, that it would be highly proper not to delay for fear that the inflammation that might ensue would tend toward the suppurative rather than the adhesive exudation.

Considering, now, operations intra-peritoneal: If it be true, as taught by Rokitansky, that "the product of inflammation exists pre-formed in the whole blood;" by Paget, that "the exudations correspond with the general health," and by Copland, that, when the organic nervous or vital power is much impaired, the fluid effused is septic, and incapable of coagulation, or of becoming the medium of adhesion—then I assume, that in gynecological operations the doctrine held by ovariotomists, to wait until the health becomes impaired, is not sanctioned by sound pathology. That this doctrine is taught will be made apparent by the following quotations:

From Sir Spencer Wells, in 1872: "So long as there is no great emaciation, no wearying pain, no distressing difficulty in locomotion, the patient should be left undisturbed."

In 1883, referring to the above rule, he says: "Subsequent experience of the ill-effects of delay, and of the diminished mortality of ovariotomy, lead to the conclusion that the welfare of most patients is better promoted by advising an earlier adoption of surgical treatment."

In 1885, he wrote: "In all cases of multilocular cysts or dermoid tumors, justice to the patient demands a positive recommendation of excision, and generally it should be accompanied by a warning against the danger of delay." Thus, by his observations and extended experience, he has been compelled to modify and entirely recast the views expressed in 1872.

Peaslee, in 1872, asserts: "If we delay until the health is somewhat impaired and the patient is slightly anemic, we diminish the risk of peritonitis, which destroys one-fourth of all who die after the operation." This opinion was endorsed by W. L. Atlee, Bradford, Tyler Smith, and Erichsen, they believing that by delay the peritoneum acquires an increased

degree of resistive power, becomes more tolerant of injury, and less liable to inflammation.

The idea of peritonitis, like the Raven,

"Never flitting, still is sitting."

Notably is this true with one of our American gynecologists, who would have us to believe that when

"the eye doth lose its lustre,"

and, like the world's great warrior, the woman cries,

"Give me some drink, Titinius,
As a sick girl,"

then the peritoneum has become tolerant.

Let us contrast the preceding statements with those of Frederick Treves, who says: "When the diagnosis of an ovarian tumor has been clearly established, the sooner the growth is removed the better."

Tait's rule is to remove an ovarian tumor as soon as it is discovered, for the less likely are there to be any complications.

Doran: "As soon as an ovarian tumor is diagnosticated, for the longer the tumor grows the greater will be the risk of adhesion."

With Greig Smith, the rule is to operate early. He advised that when the diagnosis is certain, there can be no gain in waiting longer in a disease that is inevitably fatal.

As the name of Thomas Keith has been placed in the list of those advising delay, I wrote a letter to him containing the following question: When would you operate in a case of ovarian tumor, the diagnosis being clear? In reply, I received the following letter:

"42 Charles Street, Berkeley Square, W., July 9, 1889.

"My dear Doctor: I have much pleasure in answering your letter of June 26th. I think that, as soon as you are sure of your diagnosis, the sooner an ovarian tumor is taken out the better. It can only be a source of danger. My early training in abdominal surgery—when at first operating we had only bad cases and large tumors to deal with—was rather for a time against early interference, because the risk of the operation was then great.

or seemed to be great, in any case. I have long got over that, and now always advise early operation. . . . . With all good wishes, believe me to be, my dear Doctor,

"Yours very sincerely,

"THOMAS KEITH."

We will close this part of the subject by the following quotation from Bantock: "I would urge, then, with all the force that the strongest conviction imparts, that ovariotomy should be performed as soon as we can be sure of the diagnosis."

One of the arguments in favor of early intra-peritoneal operation may be drawn from the injurious effects of plastic material, and the formation thereby of abnormal adhesions. In Wells's Table of one thousand cases, adhesion existed in 599 cases, with 163 deaths; percentage 27.54. In 401 cases without adhesion, 68 deaths; percentage 16.95.

Clay gives us the following statistics in illustration of the proposition that the simpler the operation, the less danger:

No adhesions	30 per cent. died.
Slight adhesions	40 " " "
Extensive adhesions	50 " " "
Extensive adhesions requiring ligatures . .	70 " " "

Koeberle refers to 69 ovariotomies:

No adhesions	15 per cent. died.
Grave adhesions	45.5 " " "

I need not repeat the rule formulated by the late Sir James Simpson, that "the mortality in childbed increased with the duration of the parturient process." Is not this the rule when applied to surgical operations? Great celerity will lessen the shock, shorten the anesthesia and the exposure of the peritoneum. If it occupy minutes, much safer than if it occupy hours.

The time required will be governed by the extent and firmness of the adhesions. Thus, Bantock refers to 183 cases:

Time occupied:

Up to 60 minutes	137 cases	12 deaths	8 per cent.
" 60 to 80 "	29 "	6 "	20.6 " "
" 80 to 100 "	10 "	5 "	50 " "
Over 100 "	9 "	5 "	55.5 " "

Keith has not had one death after ovariotomy, in nine years, where there were no adhesions.

I desire now to call your attention to the presence of serum in the abdominal cavity. This first strongly attracted the attention of Sir Spencer Wells, in Case IV., where he records death in thirty-two hours. Autopsy twelve hours after death. "He asks, Did she die of peritonitis?" He admits finding serum in the peritoneal cavity, but expresses a doubt if simple peritonitis was sufficient to cause such sudden collapse. He declares his impression is that, if peritonitis killed her, it was indirectly by the formation of a morbid poison; as the serum was very acrid he accuses the peritoneum of distilling and another part of absorbing the venomous fluid.

The late Marion Sims believed the cause of death, after intra-peritoneal operations, to be the decomposition of the blood-stained serum effused into the peritoneal cavity.

In 1865, Wells published his first volume, containing every case, whether successful or not. In 17 cases published out of 114 referred to in the volume he made autopsies, and reports the presence of serum within the peritoneal cavity; he designates it as "turbid serum," "red serum," "blood-stained serum," in various quantities from a few ounces to one pint or more, in every case death following in from twenty-four to seventy-two hours.

If you will examine the autopsies in Baker Brown's series of 111 cases, you will find expressed that "within the pelvis was found a little bloody serum." They then attributed death to peritonitis; at a later period, by J. Marion Sims, to septicemia. Now the tendency is, where death rapidly ensues after intra-peritoneal operations, that it is due to sapremia—poisoning by an alkaloidal product of decomposition.

In the *British Medical Journal* of February 15, 1882, Dr. J. Marion Sims uses the following language: "There is no more reason why the system should not be overwhelmed by the absorption of concentrated septic fluid, than by the rapid absorption by an over-dose of morphia. Opium in sufficient quantities may kill in from eight to ten hours; septicemia may do the same thing often in less time. All this becomes apparent, upon reflecting that the peritoneum is a large lymph

sac, and that the fluid within is not at rest, but circulates; hence its great power of absorption of air and fluids.

Watson Cheyne, in his lecture on septic diseases, directs special attention to the fact that the rapidity of the absorption of fluids depends upon the tension under which the fluid is: as, when the walls of the abdomen are lax and the fluid under low tension, absorption is slow. Now, if the fluid is not quickly absorbed, and the air has not been sterilized, "the unabsorbed residue becomes the medium of atmospheric microorganisms, and there they develop with extrordinary rapidity and give rise to those numerous chemical products of micro-organic growth which produce, by their absorption, the alarming symptoms which culminate in death by sapremia. If the growth and activity of microörganisms are dependent upon the soil or media, then the longer the fluids in the peritoneal cavity remain unabsorbed, the more liable are they to those septic changes.

I have already alluded to the element of time occupied in ovariotomy, and the remark will apply to all intra-peritoneal operations, in referring to the vast differences in the mortality. An operation needlessly prolonged, may be the element that will impair the powers of absorption; the effusions, if present, will not be readily taken up, and it is possible that herein lie the differences that we discover in the results of different operators; their technique may be equal, every exigency promptly met, no delays for consultation; a short operation; anesthesia limited to a few minutes; shock of short duration, and rapid absorption of effused fluids.

Bantock declares that peritonitis is an exceedingly rare cause of death after ovariotomy, and then only because matter is left behind in the cavity to set up irritation. In March, 1886, I witnessed one of Keith's abdominal sections at the Royal Infirmary in Edinburgh; afterward he remarked to me, "It is a question of sepsis whether the patient recover or not." With this idea in his mind, I could easily account for his care in sponging and not closing the wound until all oozing had entirely ceased. I am convinced that the opinion held by many writers that peritonitis destroys one-fourth, by others

that it destroys 43 per cent. of all those who die after ovariotomy, is not correct.

In Great Britain, 138 fatal cases; 59 reported as deaths resulting from peritonitis.

In the United States, 48 fatal cases; 13 died of peritonitis.

In Germany, 37 fatal cases; 24 died of peritonitis.

Spencer Wells reports 500 cases; in 127 death occurred; 48 per cent. were due to peritonitis.

Is it not possible that we have devoted too much attention to the treatment of peritonitis, and lost sight of the accumulation of serum and of its rapid decomposition when effused into the peritoneal cavity? In the language of Spencer Wells, "Did she die of peritonitis, or did she die from the effects of a morbid poison superadded to the exuded serum and rapidly absorbed?"

To those who still believe with Baker Brown that "It's the peritonitis that beats us"—to such I would address the exhortation of Oliver Cromwell when he lost patience with the Scotch Assembly, and said: "I beseech you, brethren, by the mercies of God, conceive it possible that you may be mistaken."

Conclusions.

1. "Where sapremia is the fatal factor—not shock—the peritoneum is in fact converted into a reservoir, from which a continuous supply of poisonous material pours through the lymphatics into the circulation." Knaggs.

2. If by careful toilet, we can remove all exuded serum or blood, before closing the wound, septicemia will not occur; if we thus fail to get rid of the fluid, it can be done by the drainage-tube, saline purgatives, and by religiously avoiding the use of opium.

3. Peritoneal operations ought to be quickly done, without prolonged anesthesia, cold avoided, artificial heat applied, thus preventing and promoting rapid absorption of serum.

4. In intra-peritoneal operations it is not necessary, or even judicious, to wait until the vital forces are somewhat reduced.

While preparing the above paper (August 6th) I addressed a letter to Granville Bantock, containing the following question:

"Do you regard peritonitis as a frequent cause of death after intraperitoneal operations; and when it exists, what is its true relation to septicemia?"

I received the following reply October 8th:

"12 Granville Place, Portman Sq., W., September 21, 1889.

"Dear Dr. Myers: I had already started for my holiday before your letter reached this country, and on my return I find it, amongst many others, awaiting me. Of course it is too late for me to return you an answer for the purpose for which you required it; but I may as well give you my answer to your two questions.

"1. I do not regard peritonitis as a frequent cause of death after intraperitoneal operations. Of course I am speaking of my own practice. I very seldom see such a thing. At one time, no doubt, it was a frequent cause of death—perhaps the most frequent—but since the drainage-tube has come into use it has, in my experience, become the least frequent cause. Kidney disease has of late carried off more of my patients than any other condition. Thus, although I lost eight in my last hundred operations—abdominal sections of all kinds—ovarian, uterine, and renal tumors and diseases of the appendages and peritoneum—not one died from peritonitis. Three were in the last stage, and died from exhaustion or shock, three from kidney disease, one from hemorrhage, and one—a case of exploration only—matted intestines, and died in a few hours.

"2. When, however, a patient dies from peritonitis, I think it may be safely called a case of septicemia. This may then be due to direct infection at the time of operation, or to the leaving within the peritoneum more than it can dispose of—in the form of bloody serum, etc. It is in the removal of this latter cause of death that the drainage-tube has rendered such signal service.

"Believe me to remain, yours sincerely,

"George Granville Bantock."

REASONS FOR DRAINAGE IN OVARIOTOMY.

By HAMPTON E. HILL, M.D.,
SACO, MAINE.

In reference to drainage in ovariotomy there seems to be at present a considerable difference in opinion and practice, depending somewhat upon the different methods of operating. One operator, relying upon strictly antiseptic methods in his work, discards drainage almost entirely. Another, who is not so dependent upon antisepsis, employs drainage very generally. Between these extremes there are many grades of opinion and practice. There are many reasons why drainage in ovariotomy should be generally used. Some of these I wish to call attention to briefly.

There is reason for generally using drainage where the operator is not thoroughly expert in operating. Although every antiseptic precaution may have been observed in an operation, we are yet all human and may somewhere have overlooked something in that direction, which would cause septic changes in any fluid retained in the abdomen after an operation. However dry we may leave the abdomen at the time of closing it, there is always more or less accumulation of fluid during the first few days after the operation. So long as this fluid is entirely free from any decomposition it may be perfectly harmless, except it should be excessive in quantity. It is reasonably certain that if all fluids are removed as fast as formed there will be no trouble from such a source.

It is asserted that the drainage-tube is a foreign body, a cause of irritation, a source of septic infection, a frequent cause of hernia, and that very often it drains only the pelvic cavity.

As to the first objection, I have seen no appreciable disturbance when a perfectly smooth glass tube, slightly curved, and of moderate size is used, and the dressing so arranged as not to make pressure upon the outer end of the tube. If the tube is perforated

along its sides, the perforations may become filled with organized lymph in a few days, and upon removal may cause some bleeding and irritation, but if perfectly smooth and without perforations there is never any disturbance in removing it. A drainage-tube should have a lip on the outer end sufficiently wide to prevent its slipping into the abdomen; the tubes should be of different lengths too, so that one can be selected that will not be long enough to cause the lower end to press upon the tissues beneath it. If the lower end of the tube presses upon the bottom of Douglas's cul-de-sac, it not only shuts off the drainage, but it causes backache, discomfort, and if much pressure, it may cause ulceration. The dressings should be so arranged as to absorb all drainage, and should be changed at least twice in twenty-four hours, and oftener if the drainage is very free; and at each change of dressing the whole wound should be wet with a solution of bichloride of mercury of at least 1 to 4000 in strength. At the same time I turn a small quantity into the drainage tube after removing a portion of the contents of the tube.

One of the best materials for a dressing is the moist bichloride gauze used in sufficient quantity to absorb the drainage. The gauze should be well covered by absorbent cotton. After the removal of the drainage-tube I allow the drainage opening to close of its own accord, which it does quite rapidly. After the drainage opening ceases to discharge, I apply a dry iodoform dressing. I do not remove the sutures which are of medium silk until the tenth, eleventh, or twelfth day, removing every other suture at first, and the remainder on the following day.

In my own cases, I have seen three of herniæ occurring in the lines of the cicatrix after ovariotomy, but in neither of these cases did the hernia occur at the point where the drainage-tube was used, but a little below the middle of the cicatrix, apparently from the imperfect union of the tendinous structures.

It is sometimes stated that the drainage-tube does not drain the entire abdomen, but only the pelvis. With the body of the patient lying in the ordinary position in bed, this is generally true. In my own cases I have been in the habit, after reaction has taken place, of raising the body of the patient on pillows on a plane of an angle of about thirty degrees from the horizontal, with a pillow in front of the nates to prevent slipping, and another under the knees. In this way I have had no trouble in thoroughly draining the abdo-

men. Sometimes even then, when the abdominal walls are very much relaxed, some fluid will lodge in the spaces above the true pelvis on each side of the spine, which, at the time of changing the dressings, I can cause to run from the tube by placing my hands under the sides above the pelvis, and gently lifting the back and sides of the abdomen forward for a minute or more. *The raising of the body on an inclined plane is absolutely necessary to insure free drainage.* If the pillows are carefully arranged, the position is very agreeable to the patient, and it makes a passage from the bowels and bladder easier.

Other reasons for drainage are: that if there is a recurrence of hemorrhage, the drainage-tube will notify us of its occurrence; and if there should occur any difficulty in connection with the pedicle, the drainage-tube leaves a track to the surface that may be followed by any fluid which may be formed at that point. Three cases that illustrate this in my own practice I will mention briefly. In May, 1888, I operated for an ordinary-sized, compound, gelatinous cyst without adhesions. The pedicle was carefully secured by a strong silk ligature. In closing the abdomen, there was a tendency to bleed freely from the stitch-holes, and in placing one stitch I wounded a vein, which bled freely. I removed the stitch, and carried the needle outside of it, so that the pressure of the suture would control the bleeding, which it appeared to do. Late in the afternoon, I was sent for in great haste, and found the dressings thoroughly wet with blood. The patient's condition did not indicate any severe internal hemorrhage, and I was so sure that the pedicle was all right that I concluded it must come from the wounded vein in the abdominal wall, and by that time had probably stopped. I applied fresh dressings, and left it. Some blood came from the tube during the next twenty-four hours, and then ceased. The case recovered without any other unfavorable symptom whatever. In this case I should not have suspected hemorrhage if there had not been a drainage, and quite likely my patient would have had serious trouble from this cause.

In October, 1885, I operated for a large ovarian cyst that had been tapped several times, and was extensively adherent to the abdominal wall, intestines, and liver. The pedicle was a broad, clumsy affair, which I secured with catgut by a cobbler stitch, making a single knot in each stitch. The drainage was very free,

but ceased on the fifth day, when I removed the tube. On the sixth day, the patient complained of some discomfort in the region of the pedicle, and there was some increase of temperature and pulse until, on the ninth day, the pulse had reached 120, and the temperature 103°. Of course, I was a good deal uneasy as well as my patient, and had decided to open the lower end of the wound, and find, if I could, the trouble. At this time some fluid made its appearance where the drainage-tube had been removed. I separated the surfaces with a steel director, and there gushed out a considerable quantity of very offensive-smelling, decomposed blood. I washed out the cavity carefully every six hours, until there was no further need of it. At the end of twenty-four hours the pulse and temperature had fallen to nearly normal, and the patient recovered. In this case the hemorrhage probably occurred on the sixth day, from the catgut stretching or giving way too soon, and the catgut was probably not aseptic, as it should have been, and as I supposed it was. I have never used catgut on a pedicle since. In this case the fluid followed the track of the drainage-tube, although the tube had been removed four days.

In April, 1887, I operated upon a patient sixty-three years of age, for a gelatinous cyst which had been ruptured for some time before the operation. At the time of the operation, about a gallon of gelatinous matter was free in the abdominal cavity and thoroughly mixed with the intestines; the latter, in many places, were covered with organized lymph, which would hang like a fringe from a towel. The drainage was very free, but stopped on the sixth day, when the tube was removed. Up to the ninth day the pulse and temperature were nearly normal. On the ninth day they began to increase, and there were some pain and soreness over the pedicle, which increased; a hard bunch formed and extended toward the lower end of the wound by the twelfth day. I pulled open the point where the drainage was removed, and there was a free discharge of pus, which continued for some days. After the escape of pus, the pulse and temperature fell rapidly to normal, and the patient soon recovered, with the exception of a small, fistulous opening, which discharged a very little moisture. Eighten months after the operation, the patient removed from the opening the silk ligature with which I had tied the pedicle, and the slight opening healed permanently. The material

was carbolized silk that I bought all prepared. Moral: prepare your own silk, and be sure that it is aseptic before leaving it in the abdomen. In this case the pus followed the track of the drainage-tube to the surface, as did the blood in the other, and I am of the opinion that this following of the drainage track would generally occur in similar cases.

My experience in ovariotomy is comparatively limited. My cases have not been selected; I have taken them as they came along, both the good and the bad. My last case was seventy-two years of age, very feeble, and had been sick in bed for several weeks. I have operated twenty-six times, with twenty-five recoveries. The patient that died was at the time of the operation very much reduced. The tumor was subperitoneal, which I removed by enucleation. The patient died three hours after the operation, from hemorrhage and shock. If I should have another such case, I would cut away such portions of the sac as could be readily separated, treat the edges by cautery, open all partitions into a common cavity, cleanse thoroughly, leave open into the abdominal cavity, close the abdomen, leaving a good drainage for the abdomen, as in ordinary ovariotomy. I should not attempt to drain the sac separately. In the twenty-six cases, I used drainage twenty-four times. In no case have I seen any trouble arising from the drainage-tube. The use of drainage, of course, makes more work for the operator if it is properly taken care of, but this is not to be taken into consideration when a human life depends upon it. In my list of cases I cannot think otherwise than that quite a number of them owe the preservation of their lives to a glass drainage-tube.

DISCUSSION ON THE PAPERS OF DRS. MYERS AND HILL.

Dr. E. E. Montgomery, of Philadelphia.—I have been exceedingly interested in both these papers, and feel that these gentlemen have conferred a great obligation upon us in presenting such excellent essays. The paper of Dr. Myers I will not attempt to discuss. He has so ably presented the subject that it would be useless for me to attempt to add anything to it.

This question of drainage in abdominal surgery is one of the most important. Dr. Hill, in the frequency in which he has drained, would

certainly please my friend Dr. Price, whose advocacy of frequent drainage in appropriate cases is well known. It would seem to me that, in the consideration of abdominal surgery, we must practise no procedure unnecessarily, nor leave anything undone that is essential for the good of the patient. It is an important matter to decide when the drainage-tube should be used and when omitted. I do not feel that it is an instrument that should be used when it can be avoided; where the opportunity for recovery is as good as if it was used—in those cases where there are no adhesions—I do not see the wisdom of the introduction of the drainage-tube. In cases where there are many adhesions and free oozing, in which the cavity has been soiled by pus, in which there is a probability of some septic matter remaining, or in which, possibly, portions of the cyst have been left in the abdominal cavity—in such cases drainage is certainly absolutely indicated.

In regard to the method of dressing the wound, Dr. Hill, if I understood him correctly, suggested that the dressing should be removed frequently from the whole wound. If, however, we use the rubber dam, applying this over the tube, and thus shutting it off from contact with the dressings, we may permit the latter to remain until the time comes to remove the sutures from the wound. Again, in regard to the introduction into the drainage-tube of antiseptic fluid, I think he advised a bichloride solution. This would seem to me rather objectionable, as it would likely cause a certain amount of irritation to the surface of the peritoneal cavity. I would prefer, if an antiseptic should become necessary, the boro-glyceride. In cases in which we fear unpleasant adhesions the use of a boro-glyceride solution in the drainage-tube is very effective. Instead, then, of treating the cavity dry, fill it with boro-glyceride. We then find that the peritoneal cavity heals over without those adhesions which might occur if we treated the cavity perfectly dry. I must compliment the author upon his excellent results—results not excelled by many who have had much larger experience than he.

Dr. A. Vander Veer, of Albany, N. Y.—The paper presented by Dr. Myers is a most excellent one, and so able in all its make up that it is difficult to discuss it. He has brought out some points of great interest.

Dr. Hill has given us some very terse suggestions in his paper, and it has made a strong impression upon me. As I said a year ago, I do not use the drainage-tube as frequently as some other operators. As the term "ideal operation" has been used here to-day, permit me to say that I look upon a case of ovariotomy, a simple uncomplicated one with no adhesions, as such, and as the simplest of all surgical procedures. I never felt any confidence in catgut. It is not safe to tie the pedicle

with it. An ideal operation ought to go on well, no drainage-tube being necessary. In my cases during the past year I have become more convinced that putting in the drainage-tube is a safe thing to do, using one of moderate size, then fastening the lower suture in the lowest part of the wound, and placing the next suture so as to surround the tube above. I then place around the drainage-tube a pledget of iodoform gauze, and another above and over the incision. I then carry strips of iodoform gauze down to the bottom of the tube, instructing the nurse as soon as that becomes soiled to change it. Three weeks ago I did a section in which I removed a multilocular tumor weighing fifty-seven pounds, with adhesions to almost everything. The drainage-tube was kept in six days. Then secretion had all ceased, and I removed it, placing in a short rubber drainage-tube, which was gradually withdrawn, and everything went very handsomely.

In regard to a remark by Dr. Potter as to using the pitcher in washing out the cavity, I do not quite agree with him. I like the irrigation better. I let a certain amount of fluid remain in the peritoneal cavity after flushing. As to the kind of drainage-tube, I use glass; but about eight months ago I introduced a glass drainage-tube in a case of tubercular peritonitis, but, on the sixth day, in attempting to remove it, it was found solidly and firmly fixed. Finally, after a few hours, I succeeded in removing it. The surrounding tissues had penetrated the openings of the tube, hence the removal was very embarrassing.

The cases reported by Dr. Hill are exceedingly satisfactory to me. I do not believe there is another such a record in this country—of twenty-six cases with twenty-five recoveries in first operations. Furthermore, as Dr. Hill has incidentally told me, his doing twelve ovariotomies before he ever saw any one else do the operation, adds to the interest in his remarkably successful work.

Dr. Joseph Hoffman, of Philadelphia.—First, about Dr. Myers's paper: The doctor has brought us the idea advanced by some others that the healthy peritoneum absorbs these germs that produce peritonitis, without injury. That is all well theoretically, but I think there is one thing the matter with it—that it is not true, in its widest sense.

It is strange that the pus cases and the ones in which you find the most inflammation are the quickest to react and more speedily to get well. This is a case of pathology on one side, and fact on the other. So far, now, as the effusion into the peritoneum is concerned, the paper deals with facts, for it says we have deaths when we do not have peritonitis. Peritonitis lasting a number of days produces an inflammatory exudation that is not absorbed in the peritoneal cavity. These are the cases

which recover if the abdomen is reopened and washed out. It is sepsis by absorption without the ordinary signs of peritonitis which will not yield to such measures.

Referring to Dr. Hill's paper: He deals with a subject that ought to be almost hackneyed. But, unfortunately, it cannot be as long as we have men who dispute its efficacy without having tried it. When Martin, of Berlin, has fourteen cases die out of seventy-seven, I do not think we ought to follow Martin very closely in anything pertaining to drainage. His operative dexterity none need dispute, and few can hope to equal. Then again they go to other extremes in Germany. One man reports two cases where he opened up the sacrum to get at a pus tube. That is as useless as to go up through the diaphragm to remove the tonsils. The introduction of disinfecting fluids into the peritoneal cavity is a dangerous thing. If Dr. Hill has had no accidents by this means he is fortunate. If you desire to wash out the drainage-tube and keep it perfectly clean you can use a ten per cent. solution of sulphurous acid. I would hesitate to introduce boroglyceride into the cavity because of its hygroscopic quality. The after-treatment and changing of the dressings goes past dispute, but the use of the rubber dam around the drainage-tube obviates this to a great extent. Leaving in the stitches a week or ten days, if introduced carefully and if they are thoroughly clean, is not at all dangerous. We heard yesterday about the early removal of the stitches, to prevent stitch-hole abscesses. They occur sometimes in spite of us. So far as the danger of ligatures discharging from the track of the drainage-tube is concerned I think, with ordinary care, we need fear little. I have had only one case myself in which it occurred. About the tube: the curve is not necessary at all. The perfectly straight tube will do the work and is more easily cleansed.

Dr. C. A. L. Reed, of Cincinnati.—I desire to record myself as a hearty advocate of drainage in appropriate and even in all doubtful cases. Formerly, however, I did not employ drainage so frequently as at present, for the reason that the tubes in use were so large that I feared trouble would ensue from their enormous open ends in the pelvis; and again, from secondary complications, such as hernia and fistula. Hence, I have had drainage-tubes specially constructed, smaller in size, with perforated sides, and with the lower end closed, their general shape being much like a test-tube.

A further considerable experience in the employment of drainage, too, has taken away the fear I formerly had in regard to a supposed weakening of the abdominal walls from the presence of the tube, and

I no longer consider a properly placed and attentively cared-for drainage-tube as likely to cause either hernia or fistula.

The advantages resultant from irrigation and drainage are well illustrated in a case in which I operated a few days ago. I removed a papilloma of the ovary weighing forty-six pounds, where there was a complication of secondary peritonitis. The discharge of serum through the tube was simply enormous in quantity. The operation wound was dressed around the tube with the rubber dam and antiseptic cotton, and the tube was injected every two hours with a five per cent. solution of sulphurous acid. The patient is now convalescent, and I attribute the successful issue to the thorough irrigation and drainage.

Drs. Myers and Hill have presented two instructive and most valuable papers, and it is with gratification that I find myself mainly in accord with their views.

Dr. Rufus B. Hall, of Cincinnati.—Though I am an advocate of drainage in these operations, and most thoroughly and heartily congratulate Dr. Hill on his excellent success, I am not able to report results that equal his. In fact, I believe that there are certain cases where the drainage-tube will not save the patients. I am like Dr. Hill in one particular. I have operated on all the cases that have presented themselves, both good and bad. I wish to refer to two cases. One had been treated five weeks for typhoid fever. I saw her on Sunday night, and urged an immediate operation, although her temperature was 104 2-5°; pulse 120 to 130; and when the family asked me what I thought her chances were to get well if I did the operation, I said I did not think it was one in a thousand. The operation was commenced at 12.30 Thursday morning. What I had anticipated would be a difficult operation was extremely so. The tumor was not large, weighing only about twelve pounds. It proved to be an intra-ligamentary suppurating cyst. I enucleated and left between fifty and sixty ligatures inside of the peritoneal cavity. The patient rallied from the shock, but lived only two days. The operation was one of the bloodiest I have ever encountered. The drainage-tube did excellent service in this case; some two or three pints of fluid were removed thereby. I was very severely censured by almost all parties connected with the case; but I have adopted this plan—to do my duty and let the censure fall if it must. This case had been treated by a homœopath. The next case had been treated for four weeks for typhoid fever by an eclectic. The temperature was 103°. She demanded an operation, and I operated forthwith. Adhesions were firm and extensive. She had had two or three attacks of peritonitis before that. This case required an extremely long incision; the great omentum was almost wholly removed.

I used a drainage-tube in this case; the tumor was suppurating. She was around the house in eighteen days after the operation. In reference to dressing the wound after the operation, I almost invariably use the rubber dam, and hence do not expose the whole of the wound in its care. I pump out the drainage-tube at intervals from half an hour to two hours, according to the quantity of fluid that accumulates. I do not let it run over and soil the dressing, but keep it and the wound dry until union has taken place.

Dr. Joseph Price, of Philadelphia.—I will be as brief as possible. Good English fails me to express my appreciation of the two papers. You all well know what confidence I have in drainage in pelvic surgery, and hence how much I appreciate the papers and the results of drainage. Dr. Myers has probably shot over the heads of the profession in general. But few will fully appreciate his contribution; it is simply too advanced for many of them. We have in these two papers some very valuable demonstrations of what drainage will do, and how patients will die in its absence. In discussing the subject I will give simply my practical experience. We have had some expression of valuable experience from our friend Dr. Dunlap, and we all ought to value it very much. If he had changed his ways in only two particulars, his mortality would not have been seventeen per cent., but less than seven. I was not at all hurt when he said bad surgery meant drainage. While we have in these papers facts to compare with Dr. Dunlap's work, we all understand, laboring as he did in the wilderness with very little assistance and no counsel, he had unprecedented success. Twenty-seven per cent. in six hundred cases in Sir Spencer Wells's work compared with seventeen per cent. in four hundred, working at such disadvantages, is very telling.

Four hundred cases non-complicated and non-adherent. An ovariotomist has no right to do such a case; he should turn it over to a beginner to prepare him to do good work.

In regard to bad surgery, there are two or three points just here that would indicate what I mean by bad surgery.

1st. *The use of ligatures and the character of the ligature.* In some few cases the cheesy disorganized tube extends even into the uterus; in that case you may look for a fistulous opening, or the discharge of a ligature in some few instances; but in the majority of cases the cheesy disorganized condition commences half an inch or an inch from the uterus. I am speaking from an almost every-day experience, and know what I am talking about. Now, in this unhealthy condition, if you tie hard up to the uterus, you will never have a liga-

ture come away. In some cases I would counsel even curetting out the disorganized tissue. Dr. Hill had twenty-three or twenty-four cases of drainage out of twenty-six, most of them complicated. Twenty had adhesions and oozing surfaces, hence the drainage-tube was in those cases important for a few hours or days. The point Dr. Vander Veer made was a very good one. Many have the impression we are draining in everything. I drained forty-six of my first hundred cases, and fifty-six per cent. of the second, and now drain about sixty per cent. But in most of these cases I was operating for disorganized tubes and ovaries—pus. I saw this morning a patient that I would railroad; build her up if you can. I have tried it repeatedly and succeeded in some cases and failed in others. I want just to allude to the results of some of the later ovariotomists. Dr. Dunlap began operating with a smaller mortality than Atlee. I once asked an old ovariotomist: Whether they drained in the early days and what the patients died of? Whether they made post-mortems and what they found? He said sometimes they would find a gallon of fluid serum. Keith calls our attention to the enormous amount of fluid serum escaping from the tubes in his drainage cases.

2d. *The drainage-tube and how to use it.* Placing the drainage-tube in the pelvic cavity does not perplex me much. Place it at the most dependent point. Do not place it as you would run a knife into a watermelon. My practise proves you cannot clean a drainage-tube too often, if there is much flow. I like a wet tube, *but I like it kept dry.* Some one has suggested the introduction of a so-called drainage-tube stitch; that has been condemned years ago as useless and harmful. The case of Dr. Hill illustrates the danger of the drainage-tube stitch. Had Dr. Hill, when he removed his glass drainage-tube, dropped down a small rubber tube half-way to the bottom, he would not have had the disturbance he encountered.

3d. *About irrigation.* I cannot agree with Dr. Hill that the tube necessitates more labor. The recovery is quicker and more satisfactory in drainage cases. There are many less sequelæ in cases that have been carefully irrigated and drained. I have repeatedly demonstrated this recently. I am not myself in favor of large ligatures; large soft ligatures will break easily. They have not been compressed, and are not self-binding, as some of the other ligatures are. There is much more risk of their slipping and stretching, and, besides, they will not glide as do the twisted ligatures, or the Chinese silk. Trim up all disorganized tissue. Drainage does not mean that condition of things that you have after a flood—railroad ties, barrels, etc., coming up through the tube.

In regard to the dressing, I think it fairly good practise to change it in twenty-four hours; it is more comfortable to the patient. If you prefer dry dressings—and they are the best—you will make your patient more comfortable by changing the dressing the second day, but not again for ten days. The removal of the dry stiff dressing is grateful. I do not think it best to leave a tube full. In regard to perforations of the tube you will sometimes suck numerous shreds of adhesions in through the large perforations. If you use the small tube, and rotate it occasionally, this will not occur. Everything in pelvic surgery must be perfection itself. There is no hurry about removing the tube, except where applied in doubtful cases. You can get along without drainage in many cases if you prepare your patient carefully. I prefer purgation before the operation, not after. Tait has said he drains less than formerly, and relies on salines. He minimizes everything, and can use salines earlier. In his work the operations are short, the anesthesia short, and he has the least operative disturbance. This is not true with slow operations.

In regard to Martin's work, I have condemned it so often I am almost ashamed to allude to it. Dr. Hill used one dirty carbolized ligature and it came away.

Dr. E. S. Ricketts, of Cincinnati.—There are a few things that present themselves to my mind as to drainage. In pyosalpinx it seems to me that in gathering the tube with the fingers as close as possible to the fundus you should strip it toward the distal end. There is another thing I have found in drainage: in the rubber tubing attached to the end of the syringe, where it is put on for the purpose of bringing suction to bear, many times the tube will come in contact with the pelvic floor, and give the patient a good deal of pain.

Dr. Joseph Price.—A word in regard to using the ordinary glass syringe. It is not to be preferred. I find the long hard-rubber uterine syringe to be the best. I have one nurse that has nursed forty-five consecutive cases with drainage-tubes without a death. This girl has never seen a training school, and I am glad of it; I trust she will never enter one.

Dr. L. S. McMurtry, of Danville, Kentucky.—The point mentioned by Dr. Price as to the manner of tying off friable pus tubes from the uterus is a very important one. These operations present more difficulties than any other class of intra-pelvic operations. The caseous tissues will break away under the ligature into the very muscular substance of the uterus. After curetting these places they may bleed freely after the patient reacts. Monsel's solution cannot always be trusted to control it, and at best it is not a neat application.

It occurs to me that when the tissues are degenerated and refuse to hold the ligature even down to the uterine tissue, the best method to secure the surface left would be one I saw utilized for similar purposes by Professor Freund, of Strassburg. It consists in passing a needle armed with a double silk thread underneath the bleeding surface into sound tissue, and tying these ligatures on each side. This, I believe, is better than the use of the actual cautery, or styptic solutions.

Dr. Myers (closing the discussion of his paper).—The doctrine that healthy tissues destroy germs is, I believe, now admitted by all pathologists. Billroth, Cameron, and others advocate this doctrine. If this be not true, how are we to have union by first intention? It is proved at this very moment that blood itself is antiseptic—almost equally antiseptic with boracic acid or the bichloride of mercury. Another point I desire to call attention to in connection with the subject of drainage is that it was evidently inaugurated by Keith, of Edinburgh, when he spent so much time in cleansing the peritoneum after ovariotomy. The next step was by Marion Sims, who discovered serum in the cavity, and concluded that it was the cause of death. What is the object of drainage? It is to prevent the accumulation of serum in the peritoneal cavity. I do not suppose there is now any disagreement about the use of the drainage-tube where there are adhesions, or where oozing is expected. But there are other indications which I would suggest, that lead me to believe it would answer another purpose. These are, where there is shock present, or where anesthesia has been prolonged, or where the air surrounding the patient has not been sterilized. And why? Because absorption is interfered with, and therefore does not go on. When the abdominal walls relax, or where the vital powers are depressed, these accumulations take place, and would suggest the propriety of using the drainage-tubes.

I believe in some of these cases, where shock is present, and large quantities of hot water are introduced into the abdominal cavity, as we say to prevent shock, that the water is readily absorbed and afterward the pathogenic germs are not absorbed. I believe that some experiments might be made in this direction, perhaps with good results.

I am very thankful to you, gentlemen, for the interest taken in the paper I had the honor to present.

Dr. Hill (closing the discussion on his paper).—In the reference I made in my paper to the method of dressing the wound after ovariotomy, I did not desire to be understood as advocating any special fashion. I simply described one that I considered could be used with safety and propriety. In regard to the rubber dam, I reject it for the reason that in order to change the cotton or sponge contained in it, the

dressing has to be partly removed, which exposes the portion around the tube, and we have no way of preventing inoculation; and, again, it makes an uneven bunch under the bandage. By using a tube not too long, so that it will not project beyond the surface or make pressure upon its lower end, and covering the whole wound thoroughly with moist bichloride gauze, I have found a way of dressing drainage cases that I prefer to the rubber dam. The moist bichloride gauze will protect the fluid from decomposition for a considerable length of time, which the dry dressing will not do as well if it becomes moistened with discharge. These dressings I change as fast as they become saturated. Some objection has been made to injecting into the tube the bichloride solution. I said I withdrew a *portion* of the fluid in the tube and replaced it with bichloride solution. In that way none of the solution enters the cavity. In my use of the bichloride dressing, so far in some twelve or fifteen cases, I have seen no trouble from bichloride poisoning.

In regard to the drainage-tube, I have used one slightly curved, for the reason it seems to fit better behind the uterus into Douglas's cul-de-sac. Perhaps a straight one would answer quite as well.

One point mentioned in my paper that has not been referred to in the discussion I consider of especial advantage in drainage, and that is the position of the patient. Where there is any portion of the surface left in a condition to discharge above the pelvis, such fluid will accumulate in the abdominal cavity unless the body is lifted so that it can flow over the brim of the true pelvis. Therefore, it has been my practise since the first case I operated upon, after reaction has taken place and the circulation is good, to raise the patient upon pillows, at an angle of about thirty degrees, with a pillow in front of the nates and another one under the knees. This is a position very comfortable to the patient, and brings all fluids toward Douglas's cul-de-sac, when the weight of the abdominal viscera will tend to press the fluid out through the drainage-tube. In regard to pressure of the drainage-tube upon the peritoneum in Douglas's cul-de-sac, I have drainage-tubes of different lengths, so that I can select one that hardly reaches the bottom of the pouch. If the tube presses upon the bottom of the cul-de-sac it shuts off drainage, and produces pain, backache, and discomfort.

Sometimes, as has been spoken of, a stitch has been put in at the point of drainage, and after the tube has been removed the stitch has been tied. I find that the drainage opening closes very soon after removing the tube, without the stitch. The stitch if used may cause bleeding when tied. Hence I have always allowed the opening for the drainage-tube to close itself, which it usually does in twenty-four hours.

UMBILICAL HEMORRHAGE; ITS TREATMENT.

By LLEWELLYN ELIOT, M.D.,
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Without entering into the etiology, the pathology, or the morbid anatomy of umbilical hemorrhage in the newly born, I shall preface the introduction of my cases by a few general remarks upon the subject.

Text-books on obstetrics, diseases of children, and general medicine are mostly unsatisfactory in treating this accident, and it is to journal articles we must have recourse for what is known concerning it. This neglect upon the part of teachers is due solely to the generally accepted belief that it is a rare occurrence. In this I must differ, for cases of umbilical hemorrhage are not generally reported by physicians, owing to the fear of being charged with carelessness; again, midwives and nurses never report them. Where death follows this loss of blood, the death is stated to be from some other cause, as icterus neonati or congenital debility, since few of us care to record a death from hemorrhage.

Umbilical hemorrhage, in the newly born, arises from carelessness in applying the ligature to the cord, forcible avulsion, fungoid excrescences following the separation at the point of ligation; or it may be of spontaneous origin. The blood is thin and watery, does not coagulate readily, and may have its origin either in the arterial, the venous, or the capillary system. More cases occur in males than in females.

Accepting the figures of Dr. Joseph S. Gibb,[1] as given by Hennig[2] and by Keiller,[3] there were *reported*, from 1752 until

[1] Gibb, Joseph S.: Phila. Med. Times, vol. xiv., 1884, p. 616.
[2] Hennig, C.: Handbuch der Kinderkrankheiten, 1877, p. 101.
[3] Keiller, A.: Edin. Med. Journ., vol. xxvi., 1880, p. 389.

1881, two hundred and thirty-six cases of umbilical hemorrhage. He adds one case occurring in his own practice, one reported by Dr. T. F. Prewitt,[1] one by Dr. W. H. Rouse,[2] two by Dr. Boardman Reed,[3] making in all two hundred and forty-one cases. To these I have to add one case recorded by M. Louis Hirigoyen,[4] one by Dr. D. E. Sibert,[5] one by Dr. W. T. Plant,[6] four by Dr. J. Ingram,[7] one by Dr. W. H. Thayer,[8] one by Dr. Keser, [9] two by Dr. T. J. McCarty,[10] one by James Gilroy,[11] three by W. R. Dakin,[12] one by Dr. J. M. Van Cott, Jr,[13] and my own four cases, making the total number of *reported* cases two hundred and sixty-one.

The treatment of umbilical hemorrhage is both local and constitutional. The local means employed consist in a new ligature, compression, the application of tannic acid, subsulphate of iron, acetate of lead, spirits of turpentine, plaster-of-Paris, collodion, and the ligature *en masse*. Those of a constitutional character consist in good milk diet, calomel, sulphate of soda, the tincture of the chloride of iron, aromatic sulphuric acid, the fluid extract of ergot, brandy, and a general tonic course. These means are many times unsuccessful, the child is jaundiced, weak and exsanguined, and death must be the inevitable result. In such cases there is one treatment which should receive the attention it merits; this is the performance of a laparatomy and the passage of a ligature about the cord before its exit from the abdomen. This operation is difficult, is dangerous, and may prove unsuccessful, but it is the veritable last straw thrown to the drowning man, and even though death would not be prevented in some cases, the

[1] Prewitt, T. F.: St. Louis Courier of Medicine, vol. iv., 1880, p. 69.

[2] Rouse, W. H.: Michigan Medical News, vol iv, 1881, p. 38.

[3] Reed, Boardman: Medical and Surgical Reporter, vol. liv., 1881, p. 342.

[4] Hirigoyen, L: Mém. et Bull. de la Soc. de Méd. et Chir. de Bordeaux, 1883, 1884, p. 392.

[5] Sibert, D. E.: Archives of Pediatrics, vol. i., 1884, p. 307.

[6] Plant, W. T.: Archives of Pediatrics, vol. i., 1884, p. 376.

[7] Ingram, J.: Louisville Medical News, vol. xviii., 1884, p. 131.

[8] Thayer, W. H.: N. Y. Medical Journal, vol. xlii., 1885, p. 434.

[9] Keser: Lancet, London, vol. ii., 1886, p. 1179.

[10] McCarty, T. J.: Southern California Practitioner, vol. ii., 1887, p. 211.

[11] Gilroy, James: Lancet, London, vol. i., 1888, p. 621.

[12] Dakin, W. R.: Lancet, London, vol. i., 1889, p. 626.

[13] Van Cott, Jr., J. M.: Brooklyn Medical Journal, vol. i., 1888, p. 219.

number that would recover would more than balance the risks assumed in doing the operation. My convictions upon this point are strong, and I write as an enthusiast. Although the only case in which I employed this treatment proved fatal, the fact of the arrest of the bleeding after the ligature was applied leads me to believe that had the operation been made before the child was exhausted by bleeding—and therefore much valuable time lost—the result would have been different. As abdominal surgery is fast taking a place as an assured success, I can see no reason for this accident being denied the benefits of an early active treatment. Intelligent parents will permit any operation that promises even a shadow of success.

Case I.—In the winter of 1880, I was called to see Daniel B., colored, aged three days. Physical condition good. Both parents healthy. Bleeding occurred on the morning of the third day, but was not very profuse. It was controlled by a new ligature, compression, and the application of Monsel's salt. Condensed milk was given by the rectum, and small doses of calomel to overcome the constipation and the beginning jaundice. This child recovered.

Case II.—E. W., female, colored, born April 7, 1881, after an easy labor. Hemorrhage followed forcible traction on the cord by the mother. Pressure, styptics, and astringents failed to check the bleeding. Ligature *en masse* succeeded, but the child died exsanguined the same day.

Case III.—John A., colored, born October 5, 1881, after a slow and tedious labor. Hemorrhage followed accidental traction on the cord on the third day. Styptics, astringents, compression, and the ligature *en masse* failed to check the hemorrhage. The child died on October 9th.

Case IV.—Louisa A., colored, born at 1 o'clock on the morning of March 19th, after an easy labor of ten hours. The child was in a fair general condition. Meconium passed in due time. Hemorrhage from the umbilical cord occurred at 8 o'clock on the night of March 19th, as a slight oozing, which rapidly increased. A new ligature and a compress were applied with partial success. At half-past 10 o'clock on the morning of March 20th I saw the case. The child was jaundiced, the evacuations from the bowels were white and clayey. The bleeding continuing, pins were passed through the umbilicus and thread twisted around them (the ligature *en masse*). This was successful for a short time, when bleeding again occurred. At 11 o'clock that night the persulphate of iron was applied. At 12 o'clock on March 21st, after administering the "A.-C.-E." mixture, the pins were removed, an incision made along the side of the umbilicus and a ligature passed around the cord before its exit from the abdomen. The wound was sutured and dressed with a pad of borated absorbent cotton and adhesive strips. This controlled the hemorrhage. The jaundice was more marked. The child, twice during the operation, showed the over-effects of the anes-

thetic, and was with difficulty revived. There was no further bleeding. The child gradually grew weaker and died at 2 o'clock on the morning of March 23d, thirty-eight hours after the operation. No post-mortem was allowed, but close examination showed a small tear in the cord at its exit from the abdomen. The attending physician had administered calomel in small doses, paregoric and stimulants, had applied pressure, a new ligature, and persulphate of iron without effect.

The father was a bleeder, and the mother's health during her pregnancy was not good.

I trust obstetricians will give this subject more of their attention than they have heretofore done.

THE MANAGEMENT OF THE PERINEUM DURING LABOR.

By AUGUSTUS P. CLARKE, M.D.,
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Among the important duties devolving on the accoucheur during parturition is the proper management of the perineum. This duty has become the more important from the fact that, heretofore, lacerations have so often occurred, and the operation for their repair has so largely engaged attention and attained so high a rank in gynecic surgery. Statistics show that the various methods employed to prevent perineal laceration have not been attended with the most satisfactory results. A lacerated perineum has rendered the patient miserable for the remainder of her life.

Severe lesions have occasionally caused death, and frequently given rise to sepsis and to serious and dangerous hemorrhage. Recent investigations show that for a long time erroneous views have been held in regard to the anatomical structure of the perineum. By careful comparison I find that the results of such investigations are identical with those of the old masters. Thus in the original anatomical plates of Albinus in my possession, I find that the description and relation of the perineal muscles are elaborately set forth. Figures 31, 32, 33, 34, 35, and 36 of Plate XII., reproduced from the original dissections of Albinus, showing the levator ani, have never been equalled by any succeeding author. The transversi perinei are beautifully shown in Figures 36, 37, and 39 of Plate XII., of the same master. Cowper, who published his plates in the year 1739, has a good plate showing the transversi perinei in the male. Much of the work in this line by the old masters appears to have been lost sight of. The

figure-of-eight arrangement of muscles of the female perineum was afterward employed to represent the manner in which the perineal muscles were arranged. Thanks to Savage for his able contributions on this subject. In perineal lesion that portion of the levator ani that has been termed the pubo-coccygeus by Savage unites between the rectum and the coccyx. It is traversed by the transversi perinei between the fourchette and the anus. The transversi perinei unite behind the perineal fascia, where they form a strong fibrous central raphé. The other muscles of the perineum which give support to the viscera, and whose functions are important in a physiological point of view, are the erector clitoridis and the compressor urethræ, the sphincter ani, and the sacro-coccygeus. Though the various muscles forming the perineal group have each a separate function, they nevertheless act in unison to antagonize the contractions of the diaphragm and the expulsive efforts of the muscles of the abdomen. These sustain the rectum and the vaginal introitus, whenever contractions of these parts take place. The muscular fibres of this group are very distensible, and readily yield for the time being during a deep inspiratory movement, an abdominal contraction, rectal action, or uterine expulsion. These muscles have been aptly termed moderator muscles, for they restrain in large measure not only the action of the rectum, but the entire system of motor muscles with which they are connected.

These muscles when taken in a group bear the same relation to the motors, as the fibres of the cervix uteri do to those of the fundus. The perineum is bountifully supplied with nerve tissue which is derived from the pubic nerve, coming direct from the lower part of the sacral plexus. The uterus, both in the unimpregnated and gravid state, is also extensively supplied with branches from the sacral plexus. Thus, it will be seen that the perineum in many respects is a counterpoise to the expulsive action of the uterine zones, as well as to the other motor muscular tissue. It is intimately connected by branches of the same nerves. Whatever strengthens the support of the one, strengthens the support of the other. When the diaphragm descends the perineum yields, and after the pressure is removed or the action is remitted, the perineum is

replaced. The perineal structure is of great strength. The muscular element is protected by firm fascia and by a central tendinous raphé. The muscular fibres are not normally rigid, but are remarkably distensible; they can be spread apart like curtains, or the open front of an officer's tent. The power of this muscular structure for distensibility can be improved. Deep inspiratory movements made in singing and reading aloud or in declamation, even when the uterus is unimpregnated, cause descent of the diaphragm and downward movement of the normal perineal tissue. Riding on horseback, proper exercise on foot, gymnastic sports calling the muscles into activity, and whatever promotes regular action of the bowels and bladder, all have an especially salutary influence on the perineal tissue, giving it tone and strength for support, and increased power for distensibility and relaxation. The question then arises, Why should woman be so frequently lacerated, torn, and bruised in giving birth to a development of a mere conception occurring in the uterus, when her organism, whose arrangements, anatomically and physiologically considered, are such a marvel and whose functions in other respects are designed to be carried on with the least expenditure of vital force, to say nothing of habits and modes of living often most favoring to physical integrity and preservation? Resort to the Darwinian theory, that in the survival of the fittest and in the progress of the human race the fetal head has increased disproportionately to the size and distensibility of the parturient passages, will not suffice for a sufficient answer, when it is considered that perineal laceration has often occurred after the expulsion of the head and during the passage of a shoulder or other portion of the child. To answer the question more fully, a resort to the consideration of the various methods employed for the care of the perineum during parturition will have to be made. The method of restraining the head from making a too rapid descent during the second stage of labor has many advocates. Those who adopt this method believe that laceration occurs in consequence of a rapid advance of the head or other presenting part against the perineum, before the muscular fibres of that body have had time for sufficient relaxation. The retardation of the descent of

the head is attempted to be accomplished by the use of different means. Sometimes it is attempted by grasping the head with one hand variously applied to the occiput or other parts during the accession of a pain. Sometimes one hand is carried over the mother's thigh and the fingers of each hand are interlocked during the expulsive efforts of the uterus. Thaddeus A. Reamy endeavors to accomplish the same end by means of a bandage carried around the nates of the patient while in the lithotomy position. The bandage is on a line with the fourchette; the ends are intrusted to two assistants who are instructed to make traction during a pain in the manner the accoucheur may direct.

Another method adopted for the care of the perineum is by the application of artificial support to that body. The palm of the hand is applied on a level with the fourchette against the presenting part. Ramsbotham, Collins, and others, for the sake of delicacy, cleanliness, and convenience guard the hand by making use of a soft napkin. Some writers recommend that the presenting part be restrained while direct pressure is exerted against the perineal tissue. There are those who recommend digital or manual dilatation for overcoming rigidity of the vulvo-vaginal canal, and for insuring greater relaxation of the tissues. The forceps have been used to regulate the descent of the head. Lusk[1] states "that in cases of rigidity of the perineum he is in the habit of alternately drawing the chin down through the rectum until the head distends the perineum; then he allows it to recede. By this to-and-fro movement the parts become rapidly distensible."

Another method for caring for the perineum is by placing the left hand near the anal margin during a pain. This method is quite old, and is referred to by Parvin, who makes mention of John Harvie's tract on the subject, published in London as early as the year 1767.

In a paper "On the Production and Prevention of Perineal Laceration,"[2] read before the Chicago Medical Society by Henry T. Byford, M.D., the obstetric perineum, for the purpose

[1] According to Parvin—Transactions of the American Gynecological Society, vol. vii., 1882

[2] Journal of the American Medical Association, vol. vi. p. 252.

of illustration, is divided into two parts, the vulval or external, and the vaginal or internal. The vulval portion lies external to the muscles and the vaginal, and includes the remaining structures belonging to the perineum.

The two perineal rings can be demonstrated by hooking the fingers over the fourchette into the fossa navicularis, and pulling outward just as a pain is ceasing and the head commencing to recede. The external ring marks the edge of the vulva, and is composed mainly of skin, mucous membrane, and loose connective tissue, fat, and bloodvessels. The internal ring marks the edge of the fascia, muscles, and ligaments. The safety of the perineal body depends on the position and relation of these two rings. When the occiput engages in them before the forehead has passed beyond the ligamentous perineum there will be little danger of laceration. When the occiput does not engage the rings before the forehead leaves the coccyx, the advancing head will stretch the perineum from four to five inches antero-posteriorly, push the fourchette upward instead of downward, and drive the perineal rings before it. To prevent this form of laceration Dr. Byford recommends that the external or vaginal ring be stretched or dilated, until the lower edge corresponds to the lower edge of the internal or vaginal ring, and to retain it there. The vaginal or internal perineum is prevented from being lacerated, by securing a slow advance of the head over the deeper and posterior portions, and by directing the occiput upward under the pubic arch. When the lower edges of the two rings become the directing force they lift the occiput toward the symphysis through the already dilated outlet. The author remarks that the descent of the lower edge of the rings brings the tissues together in a solid mass near the anus, and renders them capable of meeting any ordinary propelling force without danger of rupturing. The propelling power during the passage of the head through the pelvis may be diminished, by giving remedies which will act between the pains and lessen their frequency. Opium, chloral, anesthetics, etc., have such controlling influence. The prevalent practice of accelerating the progress of the labor until the head greatly distends the perineum, and using counter-pressure to keep the vulva from being lacerated, Dr Byford further

remarks, is to injure deliberately the pelvic floor and then court rupture of the uterus. Preservation of the membranous pouch is recommended as the best means of securing a normally slow advance of the head. For several years in my own obstetric practice I have recognized, in the second stage of labor, the presence of the two perineal rings and the importance of preserving the membranous pouch, especially in case of a primipara. Although artificial dilatation of the vulval and vaginal rings has for a long time received the sanction of many eminent obstetricians, I nevertheless regard the practice as unnecessary, and often positively harmful. The presence of the hand or finger, whether in the vagina or rectum, frequently gives rise to spasmodic action of the muscular tissues of those parts.

Such spasmodic actions may precipitate contraction of the lower segment of the uterus, as well as the perineum, and lead ultimately to cervical and perineal lesions. Emmet[1] says it is a well-known fact that contractions of the uterus can be excited during the progress of labor by pressure, or by stretching back the perineum. Parvin,[2] in closing the discussion on his paper referred to, said that voluntary and reflex efforts may be excited when the rectal muscles are interfered with. The danger of such interference has long been recognized. Thus Merriman,[3] on page 145, speaking of the means of preventing a laceration, says: "Avoid irritating the vagina and inner membrane of the perineum, and guard against removing the mucous discharge naturally secreted for moistening the passage." The mechanism of labor has been well described by Dewees, who was a keen observer, and whose mind for philosophic inquiry has rarely been surpassed.

Dewees[4] says: "All writers upon midwifery make this important operation (dilatation) the effect of mechanical impulse, though many of them at the same time are forced to acknowledge they have seen it dilate when neither the distended membranes nor any portion of the child had entered its circle, to effect its opening by a wedge-like action. That the waters

[1] Principles and Practice of Gynecology, p. 384.

[2] Discussion on Care of Perineum in the Second Stage of Labor: Boston Medical and Surgical Journal, vol. cvii. p. 301.

[3] Merriman's Synopsis of Difficult Parturition, published 1816.

[4] System of Midwifery, published 1883, p. 174.

distending the membranes, and the child itself, when powerfully impelled by the uterine contraction, may occasionally have an influence on this operation, I am not disposed to deny; but if this take place it does not open this part either so kindly or so efficiently as when this is achieved by the powers destined for this purpose." Dewees explains at some length how the longitudinal fibres, by contracting during parturition, shorten the uterus from fundus to mouth and thus overcome the resistance of the circular or transverse fibres. The circular or transverse fibres, he says, by their successful and uniform contraction, enable the woman to carry the product of conception to the full period of utero-gestation. He further says: "But being thus excited to action the two sets of fibres urge the contents of the uterus toward the least resisting part of itself, namely, the mouth; by which means the membranes become distended and lengthened in the direction of the longitudinal axis of the viscus, nearly as much as this set of fibres shorten themselves." In a foot-note he remarks that the duration of labor will, therefore, almost invariably depend on the resistance of the circular fibres of the mouth of the uterus. There is much truth to be gleaned from these remarks of Dewees. In formulating the principles which have guided me in my own practice, I have been governed by the thought that, in securing the requisite degree of dilatation to insure safety to the tissues of the perineum and to the uterine cervix, full and regular contractions of the fibres of the upper uterine segment must at all times during the second stage of labor be encouraged. When the fetus has made a rapid descent during the second stage of labor, the upper segment of the uterus loses to a greater or less extent the stimulus excited by the immediate contact and pressure within. It is during this particular period of labor that the force of the uterine pains will be replaced by contractions of the muscular tissues in the segment below. The muscular fibres of the lower segment of the parturient passages will contract, and not dilate, almost in direct proportion to the pressure imparted to them by the stimulating force of the impinging head or other presenting part. This action on the part of the different segments of the uterus and in the parturient passages, I have observed invariably to occur

in a large number of cases. When any essential support to the perineal muscular tissues is made either by the hand or by the employment of any kind of device, the effect will be only contrary to our expectation, the result of an intensified action of the muscular tissue involved. The same or a similar result will follow whenever the force of the movement of the fetal head is sought to be restrained. The rhythmic action of the moderator muscles not being under control, the muscular tissue immediately above the point of the greatest resistance acting with redoubled vigor, forces at length the head through the contracting and not dilating sphincter. Such irregular action, when carefully studied, will be found to be the true cause of most of the lacerations more or less severe. In conducting a case of labor in its second stage one of the most important points for consideration should be how most effectually to keep the different segments of the uterus and the parturient passages under full control according to their physiological relation.

As the head or other presenting part descends in the second stage, it will often be found that though the abdominal muscles continue to act with a considerable degree of energy, the fundal segment of the uterine tissue gradually fails to act with the full force it did earlier in that stage; and that this failure of that segment to contract will continue more and more, until the muscular tissue lapses into a state of inertia. Consecutively with such state of inertia of the upper segment of the uterine tissue, the lower segment under the stimulus of the presenting part contracts. At the same time the upper portion of the uterine column of the lower zone, contracting more vehemently than the muscular fibres immediately below, forces the fetus onward through the external ring, whose fibres contract as moderators to those above. As said before, when the upper uterine zone contracts, the lower zone, though acting as moderator in most instances, kindly yields in accordance with the rhythmic action of the nervous force coming from the sacral plexus, and controlling the different groups of muscles embraced within its circle of distribution. It should be borne in mind that the perineal body, though placed as a moderator, is only an outer parallel to the parturient body, the fibres embracing the cervix uteri and the zone immediately above being

the inner parallel to the longitudinal and oblique muscular tissue of the uterine body.

As already stated, the nerves distributed to the perineal muscles are derived from the sacral plexus. Investigations have long since proved that there exist on each side of the cervix uteri, several large nervous ganglia and plexuses having their origin from the hypogastric and sacral plexuses. Nerves from these are distributed to all parts of the uterus, vagina, and neighboring organs. Branches of the sympathetic communicate freely with those plexuses which control the motor muscles of the parturient system. To regulate these motor muscles, and to keep under full control the different sections of the parturient system are easy of accomplishment when once their physiological relation is duly appreciated. In my own practice during the second stage of labor I have been in the habit of exercising gentle pressure with the left hand over the body of the uterus. I do not do this simply by maintaining pressure indiscriminately at some point over the uterine body, but by exercising gentle pressure over the various sections or segments of the uterine tissue that are receding from the immediate contact of the descending fetus, and are in danger of lapsing more or less into a state of inertia. The hand is spread out fan-shaped, and, by the employment of methodical manipulation, every portion of the uterine tissue—fundus, cornua, and anterior and posterior aspects of that organ—is easily brought under control and stimulated to contract at intervals more or less regular and uniform as the case may require. It is a well-known fact that in the third stage of labor a somewhat similar practice has for a long time been in use. Crédé's method of delivering the placenta, as described by Goodell,[1] is somewhat analogous to the practice here advocated for the second stage of labor. I do not, however, exercise any considerable pressure, nor do I grasp the uterine fundus through the abdominal walls for the purpose of making uterine expression of the fetus, as is done by Crédé for the delivery of the secundines. The hand is rather laid on or over the uterine tumor on all sides, and con-

[1] Braithwaite's Retrospect. part 69, p. 206, 1874. Also, On Crédé's Method of Delivering the Placenta. Edin. Clin. Journal, 1884. See also, Journal of the American Med. Association, vol. iii. p. 518.

tractions are excited by gentle and easy manipulation over any portion of the fibres of the upper segment that may be in danger of lapsing into a state of inertia. At first the attempt at such practise may not be attended with success. Perseverance in the practise, however, will enable the obstetrician in a short time to acquire that degree of manipulative skill as shall insure most excellent results. In no case do I deem it judicious or proper to effect digital or manual dilatation of the vulvo-vaginal rings or introitus. Such dilatation can only be accomplished at the expense of the integrity of the levator loop and the transversi perinei, whose fibres unite in a tendinous raphé in the centre. Such attempts at dilatation can never result in relaxation of the muscular fibres of those parts; it can only do more or less violence to the same, separating the central union of the transversi perinei and weakening the support of the lavator loop and causing finally relaxation of the posterior vaginal wall. Of course, a faulty or mal-presentation should be corrected as early as is compatible with the safe issue of the case. I cannot condemn too strongly "meddlesome midwifery." On the other hand, I hold that an early diagnosis of the fetal position *in utero* is most material to successful conduct of the case. Especially is this so in posterior positions of the occiput.

The diagnosis of such positions will be greatly assisted by the use of external palpation, and should be done before the occurrence of a caput succedaneum,[1] the presence of which would be a great hindrance to the obstetrician in making a diagnosis per vaginam. Among the recent improvements that have been made in the obstetrical branch is that of external palpation, and the perfection to which this art has been carried has rendered unnecessary many of the vaginal examinations that heretofore had to be instituted for diagnostic purposes. This is an important step made in obstetric practice, not only for protection against sepsis, but against the occurrence of violence, and laceration of the parturient passages. By the perfection to which the art of external palpation and manipulation has attained, we are enabled to forestall the

[1] See W. L. Richardson's communication to Massachusetts Medical Society, 1885.

occurrence of many accidents to the fetus, and the many peculiar positions and presentations which formerly took place when the diagnosis was largely dependent on vaginal examinations. The careful study of the practise of palpation has developed a more profound knowledge of the forces involved in the process of parturition, and has taught that parturition itself is not so much dependent on mechanical as on the conservation of an energizing force, resident within the nervous ganglia and plexuses controlling muscular tissue. The so-called practise of supporting the perineum by the application of the hand, either direct or by the intervention of a napkin to the parts, can never result in a conservation of such vital force; for the perineal tissues being in a state of contraction, and not of dilatation, will only be stimulated to contract more and more firmly around the descending part, and to produce a more or less extensive laceration of the vaginal and vulvar rings. Attempts at restraining the descent of the head by the interlocking of the fingers, or by exercise of pressure, or by other means devised, will also be futile as regards protection of the perineum, for the force of such pressure employed in the control of the descending head or other part will almost invariably be transferred immediately to a parallel of the segment, which just above is already in a state of contraction. This will be the means of augmenting the irritability and contractility of that muscular tissue, of endangering the cervical columns, and of inviting uterine laceration. The occurrence of such mishaps is usually followed by a perineal lesion. In reviewing the records of the history and conditions of one thousand consecutive obstetric cases which have occurred in my own practice, and which I treated according to the prevailing mode of practise of supporting the perineum, I find that the per cent. of perineal laceration averaged for the primiparous 15.9, and for the parous 5.25. This rate is exclusive of slight rents of the vaginal orifice and of the fourchette. In an earlier series of such cases the rate per cent. was for primiparous 16.01, and for the parous 5.35. These figures, though large, compare favorably with those given by the distinguished obstetricians quoted by Parvin.[1]

[1] Op. cit.

The author referred to, states that Schröder gives for the primiparous 34½ per cent., and for the parous 9 per cent. Winckel gives 115 in 1011 deliveries. Olshausen, according to the same authority, gives for the primiparous 21 per cent., and 4.7 for parous; Hildebrandt, 7½ per cent. for all classes. In 400 deliveries Swayne gives 31 for partial, and 1 for complete laceration. Other statistics on this point could be introduced, but their import would be far from showing that the so-called methods of supporting the perineum are satisfactory. In 200 consecutive obstetric cases, managed according to the method advocated in this paper, there was not an instance of perineal laceration. In 50 other consecutive cases thus managed there occurred only one perineal laceration. I was not called until the second stage of labor was far advanced, and at that time the perineum was swollen, rigid, and firmly contracting about the head, which was rapidly descending by the force of the tonic contractions of the lower segment of the uterus, while the upper segment was relaxed, having lapsed into a state of inertia.

I could but feel anxious for the safety of the perineum, as only a brief period of time was left in which to prepare against the occurrence of laceration. There was not sufficient time for the successful administration of chloral or of morphia, nor even for an anesthetic, and any attempt to restrain the force of the on-coming head served only to increase the irregular contractions of the lower uterine segments, as well as the muscular tissue of the perineum. I have no doubt, had I been called at an earlier hour, I should have been able to keep under control the contractions of the upper uterine zone; and by the use of opiates, chloral, or anesthetics, the lower uterine zone and the perineum itself would have relaxed sufficiently to prevent a vaginal, vulval, or perineal lesion.

Before closing this paper I would mention the occurrence of sixty other consecutive cases, including fourteen primiparous, without a perineal laceration. In all these I was called early, and was with each patient during the second stage of labor. One of these patients had had two previous confinements, in each of which there was a perineal laceration necessitating immediate closure by sutures. The history of her case showed that

at each time of confinement there was a long delay before she could be delivered of the placenta, and that she had called a different medical attendant. She also suffered much from hemorrhage and had had a slow recovery. During the time of my attendance I was called early, before the second stage of labor had begun. The upper uterine zone was easily kept under control, the membranes rupturing as the head began to descend into the cervical portion of the uterus. There was complete dilatation of the cervix, it kindly relaxing as the upper segment contracted downward. There was no caput succedaneum, and no uterine or perineal laceration. The placenta immediately followed, and the hemorrhage was moderate. The uterus at the close was firmly contracted and globular. The time occupied by labor in all was only seven hours. The patient suffered but little afterward, and made a speedy recovery. The weight of the child and the measurements of the fetal head were fully equal to either of those of the other two. Since writing the above I was called to attend the following case:

Mrs. B., aged twenty-eight years, was confined four years ago, and sustained a perineal rupture extending nearly to the sphincter ani. The perineum was sewed at the time and complete union took place. At this second confinement I was called at 10 P.M., August 25th; the patient was in the first stage of labor; the pains were moderate, and the os uteri had dilated to nearly the diameter of half-a-crown. The patient was stout, and had gained much in flesh since the other confinement. During the first few hours after my arrival the pains were normal, and gradually gained in frequency and force. External palpation developed the fact that the occiput was toward the left acetabulum, and this was confirmed later by vaginal examination. At first the anterior aspect of the lower segment of the uterus was rigid, but no attempt at digital dilatation was made. As the second stage advanced, and the head began to descend, gentle manipulation and pressure were made over the upper uterine zone; this was soon followed by a relaxation of the lower segment. The perineum as soon as reached was found to be rigid, and offered considerable resistance. To overcome the rigidity I relied chiefly on keeping under control the upper uterine segment. As the head descended the occiput engaged the vaginal and vulvar rings before the forehead left the coccyx. The perineum at length kindly relaxed without the slightest indication of laceration. The child (male) was born 5.24 A.M. following. The placenta speedily followed, and the hemorrhage was moderate. The weight of the child was nine and a half pounds, exceeding that of the

former child by three-fourths of a pound. The various measurements of the diameters of the fetal head also exceeded slightly those of the other. There was no caput succedaneum. Careful examination gave assurance that there was no cervical, vaginal, or perineal lesion. Subsequently, when warm antiseptic douches were given, the cicatricial line of the old laceration became plainly visible. The union, however, was firm, and there was no yielding of the central tendinous raphé formed by the union of the transversi perinei muscles. The time occupied by labor was seventeen hours. The patient rapidly recovered from the effects of the confinement.

A REPORT OF NINETY CASES OF RAPID DILATATION OF THE UTERINE CANAL FOR THE CURE OF DYSMENORRHEA AND STERILITY.

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I TAKE particular pleasure in presenting a report of the results following the operation of rapid dilatation of the uterine canal under ether, as suggested by Goodell in conditions—

1st. Where severe and intractable dysmenorrhea was the most prominent symptom in unmarried women; and 2d, where sterility existed, either accompanied by dysmenorrhea or not, in those married.

From a careful analysis of over ninety cases operated upon by me for the relief of these conditions, besides consulting the reports of other operators, I am led to believe sincerely in the beneficent results following this method of treatment.

Formerly it was my custom to dilate the cervical canal, where stenosis existed, by a process of gradual widening of the same by Peaselee's dilators, or uterine sounds of steel, Sims's method, etc., slowly, possibly on an average of every third day, increasing the size of the sound at each sitting. Suffice it to say, that success *never* appeared to attend my efforts in bringing about immediate relief after a very extended trial; though in the hands of some, I believe, gratifying results have been occasionally secured.

From the time that Goodell reported his work before the Obstetrical Society of Philadelphia, in 1884, on "Rapid Dilatation of the Uterine Canal" (*Trans. Obstetrical Society of Philadelphia*, 1884), I ceased using the old method of *gradual* dilatation, and substituted the *rapid*, under the influence of complete

anesthesia, with results most gratifying and noteworthy, as will be seen from the following tables:

Dilatation in virgins for dysmenorrhea, other means failing	57
Complete cure	53
No better	3
Made worse	1

Dilatation in married women for dysmenorrhea and sterility, other means failing	33
Complete cure of dysmenorrhea	33
Complete cure of sterility	27
Remaining sterile two years or more after operation	6

Indications For and Against the Operation.

For Operation.—For an operation of this nature to be successful, it seems to be essential that the pelvic peritoneum and cellular tissues be in a normal condition, the uterine adnexa also in a similar state, and I imagine when these are *not* so, many of the failures noted are thus to be ascribed. Endometritis and metritis, even with retro- or anteflexion, are *not* in *themselves* necessary barriers to the operation. The straightening of the uterus with permanent free drainage from the cervical canal, is sufficient in *itself* as a means toward a cure of the flexions, metritis, and endometritis which may exist. Indeed, it must be freely confessed, I think, that when cervical stenosis exists, endometritis, with or without metritis, is pretty sure to be found. There may or may not be flexions.

Against Operation.—It would seem utterly futile, and *even dangerous* sometimes, to operate in cases where pelvic peritonitis or cellulitis existed; and should salpingitis, no matter what the character, be present, the result of such procedure is almost a foregone conclusion—failure.

The conditions above mentioned, should be first properly treated, especially perimetritic and cellulitic inflammatory troubles, and done away with entirely if possible, before dilatation is practised. Indeed, success rarely, *if ever*, attends in any case where the conditions above mentioned prevail.

From the above, therefore, it would seem absolutely essential that, for success to follow this operation, the cases must be carefully selected.

Again, it has been my experience to find failure following what I would *now* recognize as an incomplete operation—I mean an operation where *all* the steps were not *thoroughly* carried out.

Assuredly, "rapid dilatation of the uterine canal" does not mean rapidly dilating the canal under ether, possibly from one-quarter to one-half an inch, or even an inch, and then leaving the patient, trusting to Nature to do the rest. Such a procedure is a thing of the past, I hope, where the simple "stretching" of the canal a trifle, without even the use of an anesthetic was deemed sufficient to work out marvellous results!

From a careful study of my cases, complete records of each having been kept, I am convinced of the absolute inutility of this operation as just expressed. Possibly temporary ameliora tion of symptoms may follow simple dilatation of the narrow cervical canal, but in time the patient is equally as miserable as before operation. The patency of the canal caused by the dilatation will *not* remain permanent, even where rupture of the muscular fibres about the internal os takes place, unless it be kept so by the use of some such instrument as the stem pessary, which, not only aids in *this* manner, but also acts very efficiently in straightening the whole uterine organ.

I am aware that there are many who hold that the use of such an instrument is a *most dangerous* procedure in *any* case; but I think that such views are greatly exaggerated, as in *no* instance have I seen any untoward results following the introduction and continued use of this form of pessary. This may possibly be accounted for in the careful manner exercised in its use, for I can readily understand that careless introduction of the same, with inadequate injunctions regarding its possible dangers, laid strictly down to the patient, might, and in many instances no doubt *has* given rise to most unpleasant, nay, even *dangerous* results.

The various steps in the preparation of the patient for the operation, and those concerned in the operation, that have so uniformly yielded such excellent results, are simply these:

First. The patient is to be operated upon a *week*, if possible, after her last menstrual period, thus giving sufficient time

before the next flow for the healing of the uterine tissues, which, near the internal os, become bruised and lacerated; also, the stem has the opportunity to remain a sufficiently long time *in situ*, thus materially interfering with any serious narrowing of the cervical canal.

Second. The rectum being previously unloaded by enemata, the bladder emptied, and the vagina thoroughly irrigated with a warm clean solution of bichloride of mercury, one to five thousand, the patient is considered prepared for the operation.

Third. All instruments used are to be thoroughly cleaned, and laid in a pan containing warm bichloride solution, one to five thousand. The essential surgical armamentarium is limited, consisting of a Sims's speculum, a double or single tenaculum forceps; Ellinger's uterine dilators, corrugated ends, large and small size, as modified by Goodell; stem pessaries of plain vulcanite, or Thomas's galvanic stem pessaries, none to be longer than one and a half inches; sponge-holders and small sponges; tampons of prepared cotton or wool, soaked in a thirty per cent. solution of boro-glyceride.

Fourth. After the patient is thoroughly anesthetized, placed in Sims's position, and the speculum introduced and held by an assistant, the operator seizes the anterior cervical lip with the tenaculum forceps, and gently draws down the uterus to near the vulvar orifice. This procedure tends to straighten the uterine canal for the introduction of the small dilator, which, when introduced beyond the internal os, is slowly opened, until it is thought that sufficient dilatation has been reached for the introduction of the large Ellinger, whose blades should then be separated to the extent of an inch at least, as marked on the scale placed near the handle—this being accomplished more or less gradually, and not by rude, quick measures; the stem is then introduced, the tenaculum and speculum are then removed, and the vagina tamponed; finally, a rectal suppository is introduced, consisting of opium one and one-half grains, belladonna extract one-half grain, and hyoscyamus extract one grain.

Fifth. Should pain supervene, as is the case very frequently, especially over the hypogastrium, a flaxseed poultice, with tincture of opium, is to be applied. The urine is to be drawn,

if necessary, for a day or two. Usually in a week's time the patient is enabled to be out of bed, and, provided no pain is occasioned by the presence of the stem pessary, it is to be left until just before the next menstrual flow, when it is to be removed, and after the cessation of the flow it is to be reinserted.

It was noticed, when referring to the results of rapid dilatation in virgins, that out of fifty-seven cases, four were failures — that is, they were no better after the operation than before it—and one was made much worse. This latter case was that of a girl, aged nineteen, suffering from an acutely anteflexed uterus, with a narrow cervical canal and a conical cervix ("pin-hole" os externum). It was in the winter, when the days were short, the operation was begun late, darkness obscuring absolutely all speecular observations. She took ether badly, and was only partially under its influence when the dilator was introduced into the cervical canal. There was no opportunity afforded for the use of the speculum because of the darkness, and the whole operation was performed by the sense of touch alone—the dilatation of necessity, therefore, being but moderate and ineffectual, the patient being "out from the anesthetic," and wildly tossing about the bed almost before the blades of the instrument were withdrawn. Naturally, in this instance, no stem pessary could be used. Altogether I regarded the whole procedure as not only having been poorly and inadequately performed, but censured myself severely for allowing my better judgment to be led astray, in attempting the operation under the unpromising conditions as already enumerated. In this case, pelvic peritonitis was promptly developed, and it took quite three months before the young woman was on her feet again. No one was more to blame than the operator, I felt, and I made up my mind never to allow myself a *second* time to be caught in a similar predicament.

In the other cases which proved failures, the operation was repeated in two of them, after an interval of three months, and one was operated on *three* different times with no good results. All of these, I believe, remain sufferers from dysmenorrhea at the present time. In all these latter cases the operation was

performed with the same care and precautions already mentioned as being so essential to success.

As to the value of this operation for overcoming conditions of sterility, I can only say, that the *results were far beyond my expectations.* Referring to the table, it will be noticed that *all* were suffering from dysmenorrhea, and that the operation was productive of relief in *all* of the thirty-three cases; and also, that twenty-seven out of this number became fertile sooner or later after the operation—assuredly a good percentage.

Case.	Number of years sterile.	Conception followed operation.	Age.	Dysmenorrhea.
1	2 years, 4 months.	2 months.	27	Yes.
2	3 "	3 "	24	"
3	3 " 2 "	3 "	24	"
4	3 " 3 "	6 "	27	"
5	3 " 3 "	3 "	26	"
6	3 "	2 "	25	"
7	3 " 8 "	8 "	29	"
8	4 " 1 "	3 "	31	"
9	4 "	4 "	33	"
10	4 " 6 "	3 "	29	"
11	4 " 8 "	4 "	25	"
12	4 " 9 "	5 "	27	"
13	5 "	6 "	27	"
14	5 " 6 "	7 "	30	"
15	5 " 8 "	8 "	32	"
16	5 " 9 "	4 "	31	"
17	6 " 7 "	5 "	29	"
18	6 "	15 "	28	"
19	6 " 1 "	10 "	29	"
20	6 " 3 "	9 "	27	"
21	6 "	5 "	26	"
22	7 "	17 "	38	"
23	7 " 1 "	11 "	30	"
24	7 " 3 "	5 "	32	"
25	7 " 10 "	20 "	29	"
26	8 "	4 "	31	"
27	9 "	7 "	35	"

In this connection, a pertinent question naturally arises, and is one difficult to answer: Did the operation put the patient in a more favorable condition for conception? Or, might it not have been that these patients would have conceived without such operative interference?

In answer I can only say, that in all but three of these cases operated upon, pregnancy became evident after a few months—that is, within a year. Of the three going beyond a year's

time, one conceived at the fifteenth, one at the seventeenth, and one at the twentieth month after the operation.

As to the duration of the sterility in these cases, the table shows that in all of the twenty-seven cases, more than two years had elapsed since they were married — the minimum length of time being twenty-eight months, the maximum nine years.

As to whether these cases, if left to themselves, would have conceived or not, I am not prepared to say, but I feel assured from the evidence that the operation placed them in a condition much more favorable for such a result to follow than had they been left severely alone.

A CASE OF METREMPHYSEMA.

By THOMAS E. McARDLE, M.D.,
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Mrs. T., now thirty years old, menstruated for the first time at the age of eighteen. For eight years her periods were passed without difficulty, but for six months previous to her marriage, which occurred when she was twenty-seven years old, she suffered from severe headaches at each menstrual epoch. From her twenty-third to her twenty-fifth year she was afflicted with chronic diarrhea. For the rest of her life, before and after that period, she suffered from constipation, with the exception of the nine months during which she carried her second child. She was delivered of her first child, a girl, on the 28th of October, 1886. From this time until the 19th of May, 1888, she enjoyed fairly good health. On that date her second child, another girl, was born. Six weeks later she began to suffer from a profuse leucorrhea, and to be greatly annoyed by the involuntary expulsion of gas from the vagina. Every day her embarrassment grew worse, and at night she was unable even to turn in bed without being conscious of the audible report made by the escaping gas. Her condition became painful in the extreme, as she was shut off from all society other than that of her immediate household. Once or twice when she made the attempt to see her friends she was suddenly overwhelmed with confusion by a loud passage of air from the vagina. In July she placed herself under my care for treatment. An examination revealed a laceration of the perineum to about the centre of the triangle, one side of which is covered by the vagina—that is, to the second degree of Thomas. There was a moderate unilateral laceration of the cervix, and subinvolution of both the neck and body of the uterus, together with a subacute cervical and corporeal endometritis. Both lacerations dated from the birth of the first child.

Rest, good nutritious diet, avoidance of everything calculated to disturb digestion, special attention paid to the procurement of a daily movement of the bowels, frequent hot-water douches, applications of nitrate of silver, Churchill's tincture of iodine, iodoform, depletion by glycerine, together with the internal and external application of electricity, formed the plan of treatment. At the end of two weeks she became very much better, and after six months of more or less persistent care she was able once again to go amongst her friends without being haunted by the idea that an unexpected and involuntary explosion of gas from her vagina would cause a blush of shame to

mantle her cheeks. Of course, by such treatment, the lacerations of the cervix and perineum have not been repaired. More decided surgical measures will be necessary to accomplish such an end.

I have entitled my paper "A Case of Metremphysema." Metremphysema is derived from two Greek words, metra (μητρα, the womb) and emphysema (from εμφυσαω, I blow). Dunglison, however, makes metremphysema a synonym of physometra, and defines the latter as meaning "a light, tense, circumscribed protuberance in the hypogastrium, obscurely sonorous, with wind occasionally discharged through the os uteri, with noise."

But there was in the case just reported no tumor ever discovered by me other than that due to the subinvolution of the uterus. It is true, however, that the explosion of gas never occurred whilst I was present, and as the accident happened frequently, there was never much time given for a large amount of gas to accumulate, thus to distend perceptibly the uterine walls. I am firmly convinced that the woman did not draw air into the vagina by the assumption of some special position, and subsequently discharge it with an explosive sound. Such a condition may occur when the triangle is divided through and the keystone is removed from its place in the arch. I have such a case under observation at the present time, that I hope to cure by restoring the perineum. Thomas says that garrulitas vulvæ or flatus vaginalis occurs in about one out of a hundred cases of destruction of the power of the perineal body. But the history of Mrs. T.'s case, and the cessation of the explosions after the involution of the uterus and the cure of the endometritis, justify me in believing that the air came from the uterus, and was not merely drawn from the outside into the vagina. It is not my purpose to enter fully into a discussion of the subject of metremphysema. Dr. H. C. Yarrow's valuable paper on "Physometra," in *The American Journal of Obstetrics*, August, 1883, seems to me fully conclusive that the condition exists more frequently than many authorities are willing to concede. Various theories have been offered in explanation of this phenomenon. The presence of some decomposed substance in the uterus, such as a fetus, a placenta, or retained menstrual fluid, would, of course, account for the

accumulation of gas, especially if there were some impediment to its escape. But in the case I now report there was no such substance locked up in the uterus. I have already said there was a morbid condition of the mucous membrane, the utricular follicles were the seat of disorder, and their secretory function was greatly exaggerated. The decomposition of such secretion would account for the presence of gas in the uterine cavity. But, besides, there is no doubt that the bloodvessels of the matrix sometimes secrete within its cavity a peculiar gas. Dalton tells us that every organized tissue has the power of absorbing oxygen and exhaling carbonic acid; hence there is no reason to doubt why carbonic acid gas should not accumulate within the lining membrane of the uterus. In accounting for the presence and expulsion of gas in the case of Mrs. T., I would say that decomposition of the uterine secretions occurred very rapidly, and the resultant gas was retained by the presence of a cervical plug of mucus. Whenever this plug was dislodged by any means whatever the gas found vent and was discharged with explosive force. The cure of the endometritis and the restoration of the endometrium to its normal condition resulted in the stoppage of the hypersecretion, and hence the formation of gas ceased.

SOME POINTS IN THE DIAGNOSIS OF PYOSALPINX.

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For a clear understanding in studying the subject of the diagnosis of pyosalpinx, it will be necessary to refer to the other inflammatory diseases of the Fallopian tubes as well; but only so far, however, as to make the diagnosis of pyosalpinx more readily comprehended, if possible, than it would be if we did not refer to them. In closing my paper I shall refer to two cases of pyosalpinx in which all the usual symptoms of the disease were manifested, and where there were unusual reflex symptoms present for many months before the operation. Pyosalpinx gives rise to a group of symptoms and a series of pathological conditions of unusual interest. The disease entails so much suffering upon the individual afflicted by it, that, by reason of its clinical interest and consequences, it equals if not surpasses in importance any other affection which the gynecologist is called upon to treat. To every one who is familiar with the eager activity that pervades every department of medical research and practice, there must appear to be something extreme in this statement. But the explanation is not far to seek. If pyosalpinx stood alone among the diseases of women that had been neglected for generations by the physician, the explanation might be difficult; but it has only shared what was the common lot with abdominal and uterine surgery, until removed from the neglected subjects by the work of specialists so recently, that many of the early reformers are still alive and engaged in the active work of their profession. I am convinced that the importance of the part played in the production of suffering of the victim afflicted with pyosalpinx, has received comparatively little attention from the profession at large. This is not true of men engaged in special work; yet it must be admitted that

the men engaged in general practice will and do see, and treat, the greatest number of these cases for many months before they are seen by the operator. Therefore, anything that will throw light upon the subject of the diagnosis of this disease, by pointing out the main facts upon which we rely for a diagnosis, will be appreciated by the general practitioners and cause them to appreciate more fully the necessity of operative interference, before the patient's strength has become exhausted from long and constant suffering, and will be beneficial to a large number of their patients. Although a large amount of experimental work has been done, and clinical evidence has been collected by a large number of special workers in this department of the profession, the difficulty of diagnosis in these cases remains as the great stumbling-block to progress. For this reason I shall dwell upon some of the symptoms of this disease more fully perhaps than some here may think this subject justifies. But a subject that is avowedly difficult to the specialist in his own department is obviously more difficult to the general practitioner, and if we hope or expect to afford relief to a great number of suffering women all over our land, this subject of diagnosis must be more fully understood by the profession at large than it is at present. So little has been written bearing directly upon the diagnosis of this condition, is my apology for endeavoring to give some observations and illustrative cases of my own, which can hardly fail to be of interest to you.

It is conceded now by the profession at large that diseases of the Fallopian tubes are a prolific source of serious functional disturbance, that they not infrequently cause death, and that the removal of the diseased structures is justifiable in properly selected cases. The time is past when it is necessary to bring any more proof of these facts before the profession. But what we need most is to be able to make the selection, and decide when palliative measures may be persevered in, and when operative interference becomes necessary. This is a very important question—a question that should not be lightly considered, but demanding our careful consideration, as well as that of every member of our profession. Clinically it is the most difficult task to separate the different forms of salpingitis, if it is possible to do so. But I think that it is possible to separate pyosalpinx from the other forms of the inflammatory diseases, by the careful study of the known symp-

toms of the diseases. If we will bear in mind that salpingitis rarely occurs alone, but is usually found together with some catarrhal process in the uterus and its surrounding structures, it will aid us very much in studying the disease. From increased physiological action the uterus and its adnexa are more disposed to disease. Thus it is well known that a puerperal woman, or one menstruating, is especially susceptible to the injurious effects of cold, draughts of wind, chilling of the feet and abdomen, undue exertion, etc.; and cold contracted at that time may lead to salpingitis, and eventually to pyosalpinx. While I am aware that there is a difference in opinion regarding this fact, I am in accord with Quenu and Ferrier, who are firm believers in the theory of propagation of salpingitis by continuity from the uterus in all cases.

They believe that the infection might be lodged in the tubes or extend to the peritoneum, and should the ovary become involved it is invariably secondary, and usually only upon the surface. Again, the course of circumuterine inflammation shows that the tube may be considered as the pivot of these inflammatory attacks, and that the tubal inflammation is always propagated directly from the uterus, and not through the medium of the lymphatics, as has been advocated.

Salpingitis so often follows endometritis that the symptoms are merged with those of the primary disease, or are so completely masked by them that it is not suspected until pelvic peritonitis occurs. This is the most dreaded outcome of salpingitis, and frequently the first symptom which leads the physician to suspect its occurrence. Martin has found salpingitis following endometritis in 147 cases out of 287 analyzed by him.

When it occurs during the existence of an endometritis, there is usually an increase in the symptoms so marked that they attract attention. While the pain is not so severe as that of peritonitis, it is so severe that the patient prefers the recumbent position. There is slight fever, and some slight constitutional disturbance, which point clearly to pelvic inflammation, but less acute than pelvic peritonitis. I have seen two cases in which the cause of the existing salpingitis could be distinctly traced to injecting irritating medicine into the uterine cavity. It is easily understood how such a complication might follow such a treatment. The important part played by septic infection in the production of inflammatory diseases of the uterine appendages cannot be over-estimated from a clinical standpoint; there is ample proof that the exciting cause of the disease

in a very large percentage of cases is due to infection. I am aware of the fact that cases do occur in which it is impossible to trace its origin to infection or an extension of the inflammation from the uterus, yet the possibility of either could not be positively excluded. From my observation, I am convinced that septic infection is the cause of these diseases in a very large percentage of cases, although it may be impossible to trace its origin in all of them. A source of infection, that heretofore has not received much attention, is that conveyed through the medium of a lacerated cervix, as pointed out by Dr. Skene Keith.

He expresses the opinion that it is the most frequent cause of the disease, and observes "that if greater attention was paid to the primary lesions, there would be less necessity for operative interference upon the tubes later"—a fact that has not received the attention it merits from the profession. The chronic form of the disease almost always proceeds from the acute, it matters but little what the original cause of the attack was; this statement holds good for the reason that the conditions are most unfavorable for the healing of the catarrhal process. Acute exacerbations occur from trivial causes, and the repeated attacks finally cause complete closure of the uterine end of the tube, as well as the ostium internum. In consequence of the total closure of the tube, the normal secretion—which only trickles in very small quantity into the uterus or peritoneal cavity—is retained in the tube. Then the histological composition of the inner surface of the tube and the secretion become pathological. The tubes become more or less distended with the most varied contents—they may be similar to the serum of the blood, or may be more or less thick, bloody, or purulent mucus—until the tubes become very much enlarged and sacculated. As the case advances, the large tube becomes sealed to neighboring parts, and acquires the well-known sausage-shape that is so characteristic of tubal distention. By the repeated attacks of inflammation, the existent catarrhal secretion in the tube may be, and not infrequently is, changed into pus, producing the typical pyosalpinx. While I am convinced that pyosalpinx not infrequently follows puerperal diseases and gonorrheal infection, I cannot believe that they are the only ailments that are likely to be followed by this complication, or that they are the most frequent causes of the disease. I have operated upon a number of cases of pyosalpinx in

which no cause could be assigned or traced, other than repeated attacks of inflammation following a cold contracted at the menstrual period. I believe that pyosalpinx may be developed in two different ways: by a chronic process causing dropsy of the tube, which, by repeated attacks of inflammation, is changed to pus; and it may be rapidly produced by an acute process following gonorrhea, or puerperal diseases. In no class of cases is the history of such vast importance as in those under consideration; yet it is scarcely necessary to say that in no case, from the history alone, are we justified in recommending an operation. But a history of almost constant suffering of some years' standing, directed especially to a certain locality, perhaps originating an attack of pelvic or abdominal inflammation, either connected or not with parturition, to which we may add sterility, and we have a history that will help us very much in forming a correct diagnosis. While physical signs are important, they are not more so than the history itself. By vaginal examination we can usually recognize diseased appendages; yet this is not always possible. But if we have a pyosalpinx we should be able to recognize a diseased mass behind or upon one or both sides of the uterus, in the large majority of cases; exceedingly tender upon pressure, which cannot be displaced or pushed upward with the examining finger. If, by this examination, we can make sure that the uterus is not the cause of the symptoms, and the cause of the sterility is not in that organ, which is an important factor and should have some weight in making our diagnosis, and if the uterus is found healthy, it may be excluded; it is then probable that the uterine appendages are at fault. As said before, in most cases it is difficult, and in many it is impossible, to make out the exact diseased condition of the appendages by physical examination, except in cases of pyosalpinx; but we are usually able to say that disease does or does not exist, when, taken with the history of the case, we will not have much difficulty in deciding whether or not the latter is serious enough to justify us in recommending an operation. While it may be impossible to separate the different diseased conditions of the tubes, the history of the case will aid us very much in doing so. Thus, tubal dropsy may be mistaken for exudations and accumulations of blood in the broad ligament; but here, as before, the history will aid us very much in coming to a correct conclusion. Exudations are ushered in by marked fever and acute

pain. An accumulation of blood develops suddenly, with severe pain, and causes more or less shock, followed by prostration; opposed to these conditions, diseases of the tubes are of slow progress, and cannot be felt until the disease has existed for some time. To prevent these mistakes and the confounding of symptoms, a bimanual examination should be made daily for several days, when it will be found that exudations very soon fix the uterus to a much greater extent than any of the diseases of the tubes, not excluding even pyosalpinx. Again, subperitoneal fibroids of the uterus of small size, if they should become pedunculated and be so situated as to lie against the broad ligament, might be mistaken for tubal disease; but they can usually be diagnosticated by their characteristic hardness, shape, and the history of the case for some months previous to the date of the examination.

In pyosalpinx we usually have an irregular ovoid tumor, showing swellings and constrictions not found in any other pelvic tumor, except tubal collections. This tumor is usually of small size, and we have the sensation of indistinct fluctuation imparted to the finger by a vaginal examination. The tumor may be in the retro-uterine space extending toward the pelvic brim on one side, with a second tumor on the other side higher up, or it may be at the level of the cervix uteri on one or both sides. It is closely connected to the side of the uterus; between it and the swelling there is usually to be distinctly felt a narrow furrow, which is caused by a portion of the uterine end of the tube remaining undistended by pus, while the distal end is enlarged to form the tumor. This furrow is not so plainly felt in those cases where there is a periodical discharge of pus through the tube into the uterine cavity, which does occur in some cases and is a very valuable sign in making a diagnosis. In fact, if you have all the other symptoms of pyosalpinx, with a history to confirm them, where we can feel the enlarged tube before a discharge of pus from the uterus, and immediately after the discharge we find the tube has collapsed, we have positive proof of the existence of pyosalpinx. In three cases of pyosalpinx where there was a history of periodical discharge of pus from the uterus, with temporary relief from symptoms, I have been able, by the aid of a Sims speculum, by making gentle and well-directed pressure over the tumor with a small pledget of cotton in the grasp of the dressing forceps, to confirm the diagnosis by causing pus to trickle from

the cervical canal. While I duly appreciate the fact that the diagnosis of the diseases of the Fallopian tubes is attended with considerable difficulty, I believe that the differentiation of a pyosalpinx from the other diseases of the appendages is not so difficult as generally believed, if the previous history is carefully inquired into and given due consideration and weight, and a thorough bimanual examination be made. When we thoroughly appreciate the fact that a case of salpingitis may go on from bad to worse, and finally, after repeated attacks of inflammation, terminate in pyosalpinx, as the final climax of the disease, and that in a great number of cases of the disease it is developed in that manner, we will not often make a mistake in our diagnosis. Again, the uterus is more or less fixed by adhesions and displaced to a variable degree; it is crowded to the side opposite to that of the largest swelling. With but few exceptions I have not seen anything in the temperature charts of the cases that would lead one to suppose that the tube contained pus. In almost all of the cases coming under my observation there was more or less pain present during the act of defecation; this was particularly marked in those cases where the tumor occupied the retro-uterine space. By well-directed questions I have been able to get a history of dyspareunia in most cases of pyosalpinx which I have seen. In many cases this is obviously a very delicate subject, but one, in my judgment, that has considerable weight in making a diagnosis. If pain has been a prominent symptom in the history of the case, extending over a long period of time; if the tumor is exceedingly painful to pressure, and many or all of the foregoing symptoms present, we not only have a perfect history of a case of pyosalpinx, but we have made our diagnosis, as it were, by exclusion.

When salpingitis exists without suppuration I do not believe, for that reason alone, an operation is justifiable until the patient has had the most approved local and constitutional treatment for many months. That this is the most judicious plan to pursue is proven by the fact that in many of these cases the patient is made more comfortable by treatment, and occasionally one gets rid of her symptoms and is so much improved that an operation becomes unnecessary. For these reasons these cases should always have the benefit of a prolonged course of treatment before submitting them to an operation. But after a prolonged and systematic course of

treatment, if the patient continues to suffer great pain, and where intense hysterical phenomena accompany the pain—where the tubes, ovaries, and broad ligaments and intestines are soldered, as it were, into one single mass—an operation is indicated and justifiable even if the existence of pus cannot be made out. This plan of palliative treatment is to be abandoned, however, when it is evident that the tube contains pus; then the case must always be looked upon as serious and demanding prompt relief. The same law should govern us in the management of these cases as in every other surgical disease,—where pus is present let it out; and the way to let it out is to remove the offending tube. Delays under these circumstances are dangerous. The bursting of a tube containing pus may and does not infrequently cause a fatal peritonitis—a result that has followed in three cases coming under my observation, where an operation had been refused, two of which occurred quite recently. The last two cases, I may add, were seen in consultation with the attending physicians; they advised against an operation, as that involved danger to life. They were no doubt honest in their convictions but short-sighted in their judgment, as the result of the cases so forcibly convinced them—not, however, until it was too late to be of service to their patients. One case lived a number of weeks, the other only fifteen days after the consultation. These cases, both women under thirty years of age, paid too dearly for error of judgment by their physicians. Both of the patients had all of the well-marked symptoms of the disease; although they suffered a great deal of pain they were able to be up and about the room almost daily up to the time of the rupture of the tube, which occurred a few days before death.

These cases have made such a lasting impression upon my mind that I feel that it is a duty we owe to suffering women, as well as to ourselves, to put the facts before the profession that they may see that in these cases "there is danger in the let-alone plan of treatment," as well as in that of operation. Physicians often say to me that their patients will not submit to an operation; I answer them, that, With you rests the responsibility of advising if an operation should be done, and with the patient rests the responsibility of having the operation. It is only in those cases in which there is danger to life, as in pyosalpinx, that a patient should be urged to undergo the operation. In all other cases, when I make up my mind that an operation is necessary, I usually adopt the following

plan with my patients: I tell them that in my opinion an operation is necessary, but that I will first try all other means before resorting to it. After a more or less extended course of palliative treatment, if the patient's condition does not materially improve, she decides to undergo the operation and asks to have it performed, and thus rids me of the responsibility and necessity of urging it. Everyone now knows that pyosalpinx not only destroys the patient's health, but is a constant menace to life, as well as the cause of various reflex phenomena. I have had two cases under my observation recently in whom the reflex disturbances were so pronounced, and so completely relieved after the operation, that they are of unusual interest, and will be very briefly referred to here.

Mrs. H., aged thirty-nine, married at the age of seventeen, gave birth to one child two years after marriage; had no complications following her confinement and remained in good health for a number of years afterward. Thirteen years after her marriage her husband died; and some three years later she married again. This event took place about five years ago. Ten days after marriage she first noticed that she had a vaginal discharge which became very profuse in a few days, and continued for many months. About four weeks after marriage she was seized with a sharp pain in the hypogastrium, and had to spend some days in bed. She was treated for "inflammation of the bowels," and was under treatment for four weeks, when she was considered well. She still had the discharge; she said that she used to have "the whites" before marriage, only the discharge was now much more profuse and it was different in appearance, now being yellow. Ever after this, menstruation was profuse and accompanied with much pain, causing so much suffering that she was almost constantly under the care of a physician. She was always complaining of pain in the hypogastrium, in the groins, and around the loins, which was always worse at the menstrual periods. September of last year, at her menstrual period, she had an attack of pelvic inflammation and was treated for about four weeks, at the end of which time she was able to sit up. She had hardly attempted to attend to her domestic duties when her illness seemed to have relapsed; she was confined to her bed until November, when she had another attack of inflammation, and she was very ill for two weeks, at which time she developed paresis of the entire right side; this condition came on rather suddenly, so that at the end of twenty-four hours after the first symptoms were manifest it was at the worst. She could not raise her right hand, nor flex the leg. This condition remained very much the same for four months, from which time she commenced to improve, and at the end of five and one-half months she could flex the arm and leg and could stand upon her feet, and when supported could walk a few steps by the aid of crutches. For the past five months she has suffered great pain in the pelvis, along the entire spine and in the back of the head. Examination revealed an enlargement upon either

side of the uterus, which was extremely sensitive to pressure; which is diagnosticated as pyosalpinx. The diagnosis in this case was not difficult; but to determine whether or not the pyosalpinx was the cause of all the pain in the spine and head, as well as the paralysis, was a difficult task, and one that would require the judgment and experience of an expert in nervous diseases to determine. I therefore called Dr. Philip Zenner to examine the patient regarding the nervous phenomena. He made a very careful examination of the patient, testing the strength of the muscles of the affected limbs, examined also as to the cutaneous sensibility and the state of the superficial and deep reflexes, which he found to be normal. The special object of the examination being to determine whether or not the paralysis had an organic basis, his conclusion was that the paralysis was altogether functional; and said if the pain and other symptoms with which the patient was afflicted would be cured by the operation, the paralysis would disappear also. Upon this opinion I concluded to operate, which I did at my "Home," April 13, 1889. The tubes were found firmly adherent; the right contained three and one-half ounces of pus, the left contained one-half ounce of pus.

She made an uninterrupted recovery. On the morning of the sixth day after the operation she was able to feed herself with her right hand, something that she had not been able to do since the paralysis commenced; and on the tenth day she appeared to have perfect use of the arm. The pain in the abdomen, back of the head, and spine entirely disappeared; and she went to her home on the thirtieth day after the operation very much improved in strength and flesh, with the symptoms of the paralysis entirely removed.

The second case had all of the symptoms of pyosalpinx well marked. The patient was thirty-one years old; was married nine years ago. Separated from her husband nine weeks after marriage because he had infected her with gonorrhea; she recovered within a few months, and had enjoyed comparatively good health since then, except at the menstrual periods, when she suffered considerable pain for three or four days, which was not so before her marriage. She rarely called upon a physician for the pelvic pain and tenderness, and was not subjected to any particular treatment until nine months ago, when she had a sharp attack of peritonitis, coming on after the menstrual period; that attack of inflammation confined her to her bed for four or five weeks. During and since that attack she has been under medical care constantly. Local and constitutional treatment was adopted; electricity, massage, tonics, and exercise had been tried with no good result. The case had been diagnosticated as one of fibroid tumor of the uterus, by a prominent physician of this city, and treated as such by the use of electricity for more than four months just previous to the time the patient came to my office to consult me, which was about ten days before the operation was made. When I first examined her a semi-fluctuating mass could be distinctly felt in Douglas's cul-de-sac extending to the right side, fully as large as the closed hand, with the uterus pushed forward and to the left side. On the left side high up could be felt a tender mass the size of a small orange.

With the history and this condition, there was no difficulty in the diagnosis, and I had no hesitation in pronouncing the case one of pyosalpinx. Although the patient suffered so much pain that she was scarcely able to walk, and was compelled to keep her bed almost all of the time for the past nine months, she said that she could stand the pain better than the torture of sexual excitement, which had been constantly present since the peritonitis of nine months age. This feeling was so persistent that she could not rest, not sleep but little. For several months she kept a vessel of cold water near her bed, over which she would sit much of the time and bathe the genitals. She rarely went longer than half an hour, day or night, without resorting to the cold bath, as it gave her temporary relief from the harassing sexual excitement—which was so great that she was bordering on insanity, and she frequently contemplated suicide as relief from this torture. The operation was made at my "Home," June 17, 1889. Upon opening the abdomen a mass containing pus was found behind the uterus. In trying to detach this the cyst burst and the pus escaped into the peritoneal cavity. The adhesions were easily separated, but in doing so, while raising the tube, the entire mass came away, which proved to be the right tube, containing fully four ounces of pus. Profuse hemorrhage resulted, which necessitated lengthening the incision and stitching around the broad ligament. The left tube was distended with pus and was removed; the patient made a rapid recovery, went home on the twenty-fourth day after the operation entirely relieved from all of her harassing sexual excitement and pelvic pain—the most grateful patient I have ever seen.

THE FORCEPS AS A MEANS OF ROTATING THE HEAD IN LABOR.

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On several occasions I had a chance to speak on the above subject to a smaller number of physicians or local societies, and have always been struck how little the forceps was used for this means. I am well aware that I am not giving you anything new, but something that is eminently practical, and hope it will bring out the opinion of such excellent men as are present here to-day, and with this draw the attention of the profession generally to this important subject.

In our last meeting I heard the distinguished Professor Opie make this remark concerning the use of the forceps: "If forcible rotation of the occiput or face from a posterior position is an allowable operation," etc. I wondered whether I had practised a means which was not a recognized one generally, and looked over my obstetrical note-book to see my results, which I give below. Certainly no one will say that I have been especially unfortunate either as to the production of sickness or death of my patients.

As years passed on and my experience increased I found that I was rather becoming more and more convinced of the superiority of the operation over the simple traction method, and I have never had a chance to regret the use of the forceps in this respect. I have carefully looked over the little literature at my disposal concerning this subject, and have been impressed by the following: The forceps was first used for this purpose by Smellie, and later especially by the French obstetricians;[1] in the latter part of the last century, especially by

[1] Who probably apply it more than any other nation at this day for this purpose.

Baudelocque and Lachapelle, and in Germany by Fried and Osiander. There was, however, little system adopted by them, Lachapelle even insisting upon an antero-posterior position of the forceps in cases where the head had not yet engaged in the superior strait.

Tyler Smith, after explaining the use of the forceps and urging to follow nature in the use of them, sums up thus: "The forceps acts as an extractor, a double lever, and a compressor."

Leishman, in his "Treatise of the Obstetric Operations," in *The Obstetric Encyclopedia*, p. 190, after saying it is not necessary that we should attempt artificially to produce rotation, speaks of "humoring the blades so as in every way to encourage it."

In the *Annual of the Universal Medical Sciences* for 1888, reference is made as to rectifying occipito-posterior positions by the hand, but if it fails the forceps is to be used to deliver; no mention being made of changing the position of the head by that instrument.

Cazeaux and Tarnier (vol. ii. p. 273) are very plain and explicit on this subject, and give it their full approval. The translator of the work relates a case of great interest and not at all uncommon, which is well worth careful perusal.

Dr. A. Martin, p. 180 in his *Operative Geburtshülfe*, speaks only conditionally of the use of the forceps for the purpose of correcting an occipito-posterior position.

Scanzoni, in his masterly work, *Lehrbuch der Geburtshülfe*, Wien, 1852, vol. iii. p. 180, and vol. ii. p. 428, devotes thirteen pages to this subject. Viewing it from all sides, he systematizes the operation and gives it the highest praise. It is the most complete reference to the subject I have been able to discover.

Lazarawitch, of St. Petersburg, in the *Transactions of the Ninth International Congress*, presents a new forceps, with a head curve only, to which he ascribes special utility in this direction.

Lusk advises the use of the forceps in face, transverse, or mento-anterior positions for this purpose, but does not advise its use in rectifying an occipito-posterior into an occipito-ante-

rior position. He warmly advocates this means in an occipito left or right anterior, and in a footnote says that "he became convinced of the superiority of the methods the description of which he has given above."

Schröder, in his *Lehrbuch der Geburtshülfe*, Bonn, 1874, pp. 268 and 272, concedes the utility of the forceps in occipito-anterior, lateral, and posterior, as well as face, mento-lateral, and posterior positions only in a note. Evidently he does not favor the operation, or rather refers to others who do not favor it. Speaking of vertex presentation, he says, p. 272, for instance;

"Wir ziehen es vor, in Uebereinstimmung mit Hecker u. a. in allen Faellen in denen nicht eine ganz dringende Indication zur Anlegung der Zange auffordert, die naturliche Drehung abzuwarten, in dringenden Faellen aber den Kopf mit nach vorn gerichteten stirn zu extrahiren."[1]

E. von Siebold, *Geburtshülfe*, Berlin, 1828, p. 171, speaks of the possibility of remedying an abnormal rotation in but a few words. He says: "Man versuche hernach den Kopf wachrend der Tractionen so zu drehen dass das Hinterhaupt nach vorne zu stehen kommt."

H. Bush, Froriep, and Burke, books that have appeared between 1828 and 1846, apparently knew nothing of the use of forceps for this particular method. From personal acquaintance I know that C. Braun and Bandl, as well as the whole Vienna and Prague school, strongly recommend and teach the method wherever it is applicable.

Edward P. Davis, in *A System of Obstetrics by American Authors*, just published, does not begin to give the subject of artificial rotation the importance which it deserves, calling it an "exceptional or incidental function."[2] I have always placed the function as a rotator equal to that of a tractor, wherever such use was indicated.

It will be proper that I should first speak of the objections raised against this operation, and endeavor to refute the arguments by such facts as an extended experience in operative obstetrics, and an unbiassed trial have given me.

[1] In judging of the methods of German authors it is well to remember that often a certain school will pursue a definite course to the rigid exclusion of all others.

[2] Vol. ii. p. 134.

1. It has been said that the artificial rotation is superfluous, since daily experience shows that the head will rotate in the forceps in that direction which would take place were the case a normal one.

This is certainly a daily experience with those who do not apply that means to assist in rotation, but the muscular effort on part of the operator, and crushing of tissue, and pain given to the mother, and the production of harm to the child, can only be compared to the removal of a screw from a board when it is removed by pulling it out by main force, instead of using the easy means of a screw-driver. Every obstetrician knows how difficult it is to remove the head when the occiput is posterior; how dangerous for the soft parts of the mother, and how serious to the life of the child. I think the history of the following case will illustrate the point in question:

Case I.—During the autumn of 1885, I was asked to assist in the delivery of a primipara of about twenty years, by Dr. B., an excellent physician and surgeon, who had been in attendance for over twenty-four hours.

When I saw the patient, several attempts had been made to deliver the head by forceps. Either the forceps (a short pair) slipped, or else the head did not progress when severe tractions were made by the long forceps. The patient's condition was very good; the uterine contractions had become very poor. The child's heart-beats were on the left side of the mother, and were poor. Small parts were on the right side of the mother. Head could not be felt above the pubes. The head, presenting midway in the pelvis on the height of the spine of the ischium with the small fontanelle to the left, the sagittal suture very nearly in the transverse diameter, was tightly wedged into the pelvis. There seemed to be no disfigurement of the pelvic bones.

I applied the short forceps—the same one that slipped previously—in the left transverse, almost antero-posterior diameter; with a slight twist from left to right the head was dislodged and was born, the uterine contraction becoming so severe that I hardly had time to remove the instruments.

The mother and child did well.

2. The fact that the forceps will sometimes rotate, while the head remains in the same position, has been used as an argument against their use.

Suppose they did, what was the result? Absolutely nothing; no harm has been done to the child or the mother, and the instruments are in the position that the antagonist to artificial

rotation would naturally put them. There would be no need for reapplying them.

Now, why did the forceps rotate while the head remained in the same position?

a. Because the instruments may not have been applied in strict conformity to the rules.

b. Because the head of the child may be so round, ball-like, or a head after perforation, or a hydrocephalic head of a small child, that the instrument can get no purchase on the side of the head. This I have known to occur in several instances.

c. Because of some deformity of the pelvic ring.

d. At times there can be found no reason for their slipping, when a second or third application of the forceps will be followed by a satisfactory result.

In the first instance we are to apply with proper regard for the exact position of the head, and in the second and third instances to desist from the use of a method which is then not applicable to the case.

3. I have heard some say that the application must be a very difficult one.

This is certainly not so, since I have had occasion, many times, to show others how to apply the instruments. They readily comprehended and followed it out. I have shown this at times to physicians and students who never had applied the instruments before.

4. That in the application of the forceps a great deal of time is lost.

This is certainly not so, since I can, and have seen others, apply the instruments as quickly as if they were to be applied to the sides of the pelvis. Even if it did, it would be well made up by the time saved by long tractions.

5. I have even heard the remark that the method is altogether impossible.

This objection is hardly fair in the sight of the teaching of such eminent men as Scanzoni, Cazeaux, Tarnier, Lusk, Lange, Isaac Taylor, Braun, Bandl, Siebold, and others; and even its conditional use by A. Martin, Schröder, and Leishman would disprove this assertion.

6. That rotation, especially in an occipito-posterior or a

mento-posterior position of the head, would produce a dislocation of the cervical vertebra.[1]

Out of 182 recorded cases of forceps delivery, of which 27 were occipito-posterior, I have not seen such an accident. It must be exceeding rare—theoretical to a great extent. I have found only one case alluded to, while a large number of successful ones have been reported.

Conditions which Call for the Operation.

1. When the head does not rotate though the expelling force is great.

2. When the expelling force has ceased to operate on account of the head being wedged against soft maternal parts.

The following case will illustrate:

Case II.—Called in consultation to see Mrs. W., a strong woman and not fatigued, on March 11, 1884, at 5 P.M., who was giving birth to her second child. There had been no difficulty with her first labor. She had been in pain since 2 A.M. on the above date. At 1 P.M. membranes ruptured, and very soon the cervix had withdrawn over the head. The expulsive pains were excellent at that time; very soon, however, they ceased, and the head remained at the same position for nearly three hours, when I saw her. When I examined her I found the occiput to the left and anteriorly to the transverse diameter impinging upon the spine of the ischium of the left side. Externally, small parts of the child could be found on the right side of the woman, while the child's heart-beats were heard in the left iliac region.

As it seemed desirable that labor should come to a close since no progress had been made in three hours, I applied the forceps, and with slight traction, at the same time turning the instrument from left to right on its axis, dislodged the head. Now the dormant uterine contraction awoke, and before I was able to remove the instrument the head distended the perineum.

3. Where the head has been rotated into such a position that its delivery would take an unnaturally long time, or would endanger the continuity of the soft parts of the mother, as when the occiput is turned posteriorly to the transverse diameter, or face presentation where the perpendicular line of the face is an oblique diameter.

4. All indications for the forceps generally, where we can simplify and ease delivery by imitating nature.

[1] Cazeaux and Tarnier, vol. ii. p. 981.

Conditions which would Oppose the Use of the Forceps for Rotation.

1. When the instruments cannot be applied to both sides of the head, or nearly so. There will be some exceptions to this, though they must be rare. I have, for instance, turned a head where, after careful manipulations, the forceps would only clasp the head over the left tuberosity of the frontal bone and behind the right ear.

2. When the exact position of the head cannot be made out. Whatever the cause may be for this, the operation must not be attempted. In my earlier obstetric practice, under a false impression, I turned an occipito-anterior right into an occipito-posterior right, and brought out the face under the pubes.

3. When there is a deformity of the pelvis, the attempt at rotation must always be carefully avoided, since we may be doing the opposite to what nature is endeavoring to accomplish, namely, the adaptation of the head to the cavity of the pelvis; and careful and slow tractions will be the proper thing.

4. When the head is high above the spine of the ischium, I would suggest that rotation be omitted until it reach that point. For I have, with rare exceptions, noted that this was the turning-point for the head, producing either an anterior or posterior deflection. It is for this reason that I have never applied the forceps on a head at the superior strait with a view of rotating it. Still, I have carefully kept watch of its rotations, so as to be ready to interfere should it be deemed necessary.

5. When there is a deformity in the child's head. Thus, on the head of a microcephalic or an encephalic fetus, or a head disfigured by craniotomy, the forceps certainly would not find a purchase, while a hydrocephalic head would have also lost the normal contours and its adaptability to the pelvic cavity. Lastly, a child, otherwise normal, might have such a round head that no forceps would clasp with a view to rotation.

The following case will illustrate this point:

Case III.—Nov. 8, 1880, I was called to assist a midwife in delivering Mrs. L , an Irishwoman, primipara, aged twenty-four years. She had been in labor for twenty-four hours, with excellent pains. On examination, a

very hard head with a very small posterior fontanelle to the left, and the sagittal suture in the right oblique diameter, was found. The head was on the floor of the pelvis. The forceps was applied in the left oblique diameter of the pelvis, but slipped on the head even after a second trial, and simple traction delivered the head in its oblique position. It proved to be an almost circular head, with bony development well advanced.

On Jan. 15, 1885, I delivered the same woman again with forceps, and this time had no difficulty in rotating a head which then was situated at the spine of the ischium.

Conditions which will Admit of such an Operation will be Understood by the Foregoing.

In short, they are:

1. A proper understanding of the position and condition of the head—*i. e.*, a correct diagnosis.[1]

2. When both blades of the forceps can be applied to the sides of the head.

3. A normal pelvis.

4. When the head has entered the brim of the pelvis by its largest diameter, or the presenting part has reached the spine of the ischium.

The manner of operating will naturally vary as to the number of positions we may find the head in. In vertex presentation it would, therefore, be seven positions which might call for artificial rotations; namely, occipito-left-anterior, occipito-left (sagittal suture in the transverse diameter), occipito-left-posterior, occipito-posterior, occipito-right-posterior, occipito-right (sagittal suture in the transverse diameter), and occipito-right-anterior. In face presentation the same would take place, only that the chin takes the place of the occiput. Thus: mento-anterior-left, mento-left (perpendicular line of the face in the transverse diameter of the pelvis), mento-left-posterior, mento-posterior, mento-right-posterior, mento-right, and mento-right-anterior.

Concerning the after-coming head[2] I have nothing to say, since my experience does not cover that particular field, and theoretically it does not seem practical. Since this paper is

[1] This is especially necessary as to the location of the head in the pelvis.

[2] See Cazeaux and Tarnier, vol. ii. p. 983. Scanzoni, vol. iii. p. 207.

intended to deal only with practical results of my own experience, I will not detain you by any theory.

I wish to call your attention to the fact that in doing this operation it is always necessary that the patient lie crosswise upon the bed on her back, with the hips elevated and the buttocks brought well over the bedside. If this is not done, it will be impossible to give the handle of the forceps the necessary freedom of motion.

Before we go on to speak of the methods applicable to different positions of the head, it will be proper to say that in all cases where the part to be rotated forward is in the transverse diameter or anterior, the concavity of the instrument is to point to that portion which is to be brought forward.

Let me, then, begin with the method applicable to the first vertex position.—*occipito-left-anterior*, the vertex being situated midway in the pelvis—*i. e.*, at the height of the spine of the ischium. The forceps, preferably a short pair with but a slight pelvic curve—I have always used Naegelé's forceps—are applied in the following manner: The left blade of the forceps—*i. e.*, the blade on the left side of the mother—is allowed to glide along the sacrum, and finds its position on the left side of the head of the child.

There are two ways of introducing the right blade. In the first, the blade is introduced in the hollow of the sacrum and will lay over the left side of the frontal bone; then introducing two fingers of the left hand into the vagina and placing them on the posterior edge of the blade, near the fenestrum, this is gradually forced around until the concave portion of the instrument finds its location over the right parietal bone of the child's head, while the right hand has given to the handle the proper direction. Or else, the left blade is introduced directly over the right parietal bone of the child's head. This latter method is not always practical, though it looks the simpler, as there is not enough room on the side of the pelvis when the head is in the position at present under consideration; still it will frequently serve a good purpose.

The forceps is now locked, which is usually done easily, and its position will be in the left oblique diameter with the concavity toward the obturator foramen. Before any rotation or

traction is made, the head should be reëxamined to verify, not only that no change has taken place in the position of the head, but also that the diagnosis has been correct. Rotation in the perpendicular to that plane of the pelvis in which the head is located is now made from left to right of the patient, to a moderate extent. In doing so, no trouble will usually be experienced and very little pain given to the mother. During the manipulation it is well to control carefully the movements of the head by the index finger of the right hand. Traction must be made simultaneously with rotation to a very slight extent. This is most practical when dystocia is due to other causes than non- or faulty rotation and with a high-standing head. When dystocia is produced by non- or faulty rotation, then rotation alone should be practised. After rotating, commonly a few pains will give birth to the child.

When the *occiput is directly to the left* and the sagittal suture in the transverse diameter, the same holds good as to the application of the instruments, but they will lie in the antero-posterior diameter, and with their concavity directed toward the left of the patient. Rotation again is exercised from left to right.

It will not be necessary for me to explain the condition where the *occiput is in the right-anterior position*, or directly to the right, since the same manipulations as the two foregoing take place, except that the concavity of the instruments must point in the opposite direction—*i. e.*, to the right, and rotation is exercised from right to left.

We now come to those conditions where the *occiput is posterior to the transverse diameter*. If these cases terminate by natural means, the head is usually born with the face under the pubes, unless the fortunate and rare occurrence takes place, namely, complete rotation. It is this position of the head which produces the greatest amount of suffering by prolonging labor and disturbing the continuity of the soft parts, and it is also this position where the greatest amount of good is expected from artificial rotation. The rectification of this malposition will be found a great deal more difficult than the foregoing, but also more useful, notwith-

standing the opposition it has from some excellent obstetricians.

The method employed by me was either that of Scanzoni, or that of Lange. The former I have applied most frequently, having been taught it as a student by Dr. Bandl. The principal point of this method is that the forceps must be applied twice—first, so that the cavity of the instrument will show toward the face; and then to the occiput.

The case next to be considered is where the occiput is to the *left and posterior to the transverse diameter*. In this case we again allow the left blade to glide along the hollow of the sacrum until it has been fully introduced; then it is pushed around the left side of the pelvis so that it will find its position on the right parietal bone over the ear or near it. An assistant must now carefully and quietly fix the blade. Then the right blade is introduced so as to find its position on the left parietal. The forceps is now locked, the head *carefully examined* that no change in its position has taken place, and rotation practised from left to right until the forceps is in the antero-posterior diameter of the pelvis and the sagittal suture in the transverse diameter.[1]

Sometimes it will be necessary to use a great deal of force in accomplishing our object; never forget, however, that it must be used in a perpendicular to the plane of the pelvis in which the vertex of the head is situated.

The forceps is now removed, and replaced in the position that we have explained where the sagittal suture is in the transverse diameter, or where the occiput is in the left occipito-iliac position.

Lange's method is this:[2] The left blade is introduced so that it will lie upon the left parietal bone of the child behind the ear, while the right blade is introduced so as to lie over the right parietal bone near the temporal bone. The forceps will be in the anterior-posterior diameter of the pelvis. Rotation is now made from left to right, and the occiput, with a single

[1] It will often be found that this is sufficient to produce rotation to a degree that the head will be born without further aid.

[2] Lange: Lehrbuch der Geburtshülfe, 1868, p. 513.

application of the instrument, is brought around under the symphysis pubis.

I have applied this method a number of times, but much prefer the former, since, in cases in which the head is low in the pelvis, the occiput being directly posterior, or nearly so, it is not applicable.

After saying the foregoing, it will not be necessary to describe the operation in the fourth form of vertex presentation, occiput directly posterior (sagittal suture in anterior-posterior diameter), since it would be a repetition, and the Scanzoni method is the only one applicable.

In face presentation, while the head is still not, or only slightly, engaged in the superior strait, all seem to agree that version will be better for both mother and child. But in cases in which the face has already reached the spine of the ischium, or the floor of the pelvis, the forceps must be of the greatest benefit, especially when used to assist in rotation or to correct a false rotation of the head.

It will not be necessary to describe the application of the forceps in those cases in which the chin is in or anterior to the transverse diameter, since they are the same that have been described under vertex presentation; suffice it to say that the concavity of the forceps should be directed toward the chin. Where, however, the chin is posterior to the transverse diameter, nothing else is left to the operator except to rotate either by the Lange or Scanzoni method, or perforation; for it is well known that a head, when the face presents chin posterior, cannot be born by ordinary means. Here Scanzoni's method is the most applicable.

Some French writers[1] object to the operation because of the danger of twisting off the neck of the child. Successful cases, however, have long ago been reported by Smellie, Hicks, Brown of Vienna, and Isaac E. Taylor. I have seen three cases, and all did well.

Here, also, it will hardly be necessary to repeat what has been said under the occiput-posterior position, except to let me

[1] Cazeaux and Tarnier, vol. ii. p. 982. This is probably an entirely theoretical objection.

remind you that the points and cavity of the forceps will first show to the forehead, and after a turn of an eighth or a quarter of a circle of the instrument, the forceps must be reapplied with the concavity and points showing toward the chin.

With the after-coming head I have had no experience in rotation.

Having seen but two cases in deformed pelves, what I therefore would have to tell you would be entirely theoretical or book-knowledge, both of which I have avoided.

Thus I have, as briefly as possible, described the forceps as a means of accomplishing rotation. But I must also say that the position of the patient during labor, or the hand itself, will often accomplish the same result. If it were in the province of this paper, I could relate to you a number of cases from my note-books, to testify to this assertion. In presenting my experience to you, I should say that by far the greater number occurred in consultation practice, either with fellow-physicians or midwives. It is not uncommon to be called by the latter after there had been a long delay or a standstill in the labor. The cases had been mismanaged, and it was only by careful cleanliness that I did not have more septic disease afterward.

Out of the one hundred and eighty-two forceps cases that I have notes of, there were fifty-two *occipito-left-anterior*. The labor-pains in twenty-seven were termed fair, in twenty-five poor. All the children were born alive.[1]

Thirty-four mothers were primiparæ, three had two children, four had three children, three had four children, two had five children, two had six children, one each had seven, eight, ten, and eleven children.

As to the location of the vertex in the pelvis, there were noted four as being at the inlet of the pelvis, six above the spine of the ischium, thirty at the spine of the ischium, and eleven on the floor of the pelvis.

In forty-three cases rotation was successful. In five cases no rotation was attempted because four of them were high forceps,[2] and in one the patient had convulsions and I no assist-

[1] One high forceps case died on the sixth day. The mother died on the seventh day, of scarlatina; two children in the house were sick with the disease at the time.

[2] In these cases rotation was practised successfully as soon as the head came midway in the pelvis.

ance. Four cases were unsuccessful, because of a flat rachitic pelvis in one case, a perfectly round head in two other cases, and an impossible diagnosis of the position in the fourth case.

There were fifty-four cases of *occiput directly left.* Labor pains were termed fair in thirty-three cases, and poor in twenty-one cases. Fifty-three children were born alive.[1] Twenty-five mothers had their first child, seven their second child, seven their third child, four their fourth child, two their fifth child, two their sixth child, four their seventh child, one her eighth child, two their twelfth child. In other words, more than half were multiparæ.

As to the location of the vertex in the pelvis, there were eleven reported as being at the inlet of the pelvis, ten above the spine of the ischium, twenty-three at the spine of the ischium, and ten on the floor of the pelvis.

In attempting rotation forty-six were successful, two were unsuccessful.[2] In six cases no rotation was practised, since changes in the pelvic configurations were discerned which would not admit of the procedure. One mother died of septic embolism of the eye and brain on the fifteenth day. Another[3] died of puerperal peritonitis on the eighth day.

There were twenty-one cases of *occiput left posterior.* All children were born alive. It will be proper to say, however, that one died on the seventh, and another on the eighth day, of lock-jaw. The delivery of both was not especially severe. I could not discover any cause in one child; in the other there was a slight swelling at the right ear, from the pressure exerted by the forceps. Both children were sick but twenty-four hours.

Eight mothers had one child each, three had two children, three had three children, three had five children, and one each had four, six, nine, and eleven children respectively. In sixteen the labor pains were termed good, in five poor.

The vertex was at the inlet of the pelvis twice, above the

[1] One child died from prolapsed funis and was dead before delivery.

[2] For reasons that I was unable to make out.

[3] In the first of these two cases, rotation of the head at the spine of the ischium was successful, while the second was a rachitic pelvis with a high forceps.

spine of the ischium four times, at the spine of the ischium fourteen times, and once on the floor of the pelvis.

Rotation was effected successfully seventeen times. Twice by the Lange method, and twice a single application (first application of Scanzoni) turned the head sufficiently to bring the occiput forward. Thirteen times Scanzoni's method was used.

Once by mistaken diagnosis the occiput was turned into the hollow of the sacrum, and at another time was unsuccessful from the small and exceedingly round head of the child.

In two cases there was no attempt made, for in one instance the position of the very low and long-standing head could not be made out, and in one instance the upper portion of the pelvis was partially filled with secondary carcinoma, the child weighing but four pounds.

I have never had a chance to see a case of *occiput directly posterior*.

Of *occiput right anterior* there were two cases. In one the labor pains were termed good, and in one poor. Both children were living, and were the first and third children of their mothers. Their position in the pelvis was at the spine of the ischium. One was rotated successfully, and the other by a mistaken diagnosis was rotated occiput right posterior, by two applications of the forceps.

Of *occiput right* there were three cases. Labor pains were good in all, and all children were born alive, two children being their mothers' first child, and one the fourth child.

As to the position of the vertex in the pelvis, two were just above the spine of the ischium, and one at the spine.

Two were successfully rotated, and in one the position could not be made out.

Of *occiput posterior right* there were six cases. The labor pains in four were good, in two poor. All children were born alive, two being their mothers' first child, and one the second, third, fifth, and sixth child, respectively.

Four heads were rotated successfully. In one case no diagnosis could be made out on account of the great caput succedaneum, and the large deposit of fat on the abdomen of the mother. The other case was a contracted pelvis and no attempt at rotation was made.

In my four *face presentations*, one appeared with the chin under the left acetabulum and rotation was easily accomplished, a living child being born. Three cases were such that the chin presented near the right sacro-iliac synchondrosis (forehead under the pubes). These patients had excellent labor pains; all children were born alive. One presented above and two at the height of the spine of the ischium. Two applications of the forceps were necessary to rotate the chin forward.

It will be seen that I had three deaths to deal with on the part of the mother; one from scarlatina, two from pure septic disease. All cases were those attended by midwives and under poor hygienic surroundings. One mother had a complete perineal laceration, and in another a large slough at the base of the bladder occurred.[1] Several others had fever for a few days. Two children died from lockjaw, one from meningitis on the sixth day, and another died from a prolapsed funis, but was dead previous to delivery.

[1] Due to labor lasting two days.

THE NEED OF SPECIALLY TRAINED MEN FOR ABDOMINAL SURGERY IN REMOTE DISTRICTS.

By GEORGE R. DEAN, M.D.,
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The great strides made by surgery under antiseptic precautions have so completely overthrown the traditions of the past, with a great part of its literature, that the physician who has not kept pace with advancing science must feel like a Rip Van Winkle as he walks through the wards of a modern hospital. In no department of surgery has so great advance been rendered possible by antisepsis as in the operations dealing with the abdominal and pelvic viscera.

Twenty-one years ago, when I left college, the peritoneum was considered a membrane never to be touched, almost without exception. Now it is opened, mopped with a sponge, torn and sutured, with the greatest impunity and with no more danger to life, in skilled hands, than formerly attended operation on other parts of the body. Asepsis and antisepsis, whichever is preferred by the operator, insures comparative immunity from danger, so far as mere operating is concerned, if intelligently and scientifically used. But it must be remembered that intra-abdominal surgery is nevertheless still fraught with more or less danger, and the eagerness with which so many physicians of little or no experience desire to distinguish themselves with some abdominal performance, has induced me to make this warning protest. The physician who wishes to do strict and exact justice to his patient, should never, under any circumstances, permit himself to add one unnecessary risk to the chances of recovery, no matter how great the temptations for personal aggrandizement. The details of the present ab-

dominal surgery are so varied and improved, the lines of procedure so well mapped out, that no man without this exact and careful training, and without much experience gained by careful observation, is prepared to give his patient the best chance for recovery. Hence, it is inexcusable for men in remote districts, or in the city suburbs, who have given only the barest attention to abdominal work, to attempt it, except in the most urgent extremity, where delay will more endanger the life of the patient than incapability and inexperience in the operator.

The man who opens an abdomen never knows what he is to encounter before he is safely out of it again; he may have much learning and be firmly grounded in the general principles of surgery, yet without special training in this special department he will find himself at sea, with conditions utterly unexpected.

In consequence, his progress will be slow and his work imperfectly done, and both of these are greatly against the chances of the patient. Till such warnings as these are heeded, trusting patients will fill premature graves. In cities this need not be the case, as every surgeon has opportunities for seeing and learning the methods of experts. Even here I have witnessed grave errors and a narrow escape from calamity at the hands of a distinguished surgeon, due to unfamiliarity with the technique of the work in hand. When this work is performed by experts, who are generally obtainable, there is sufficient danger without adding the additional risk of incompetency. In the light of all this it would be well for all who wish to enter into this department of surgery with clear consciences and clean skirts to prepare themselves specially for it, both for their own and their patients' sakes. A case in point recently brought to my knowledge will better illustrate this argument: At 11 P. M. a man was shot in the left inguinal region above Poupart's ligament; he was seen shortly after by a physician. At 7 o'clock next morning breathing was good; he had rallied from the shock; no vomiting. About 10 A. M. symptoms of collapse appeared. Operation was decided upon. Incision in the median line disclosed no feces in the peritoneal cavity, and digital exploration did not detect wound in gut; the incision was closed and the patient died. Autopsy revealed perforation in the descending

colon. An expert could readily have reached and sutured this, and a life would have been saved.

The *Lancet*, January 1, 1887, p. 37, gives a case of the same order, where death followed. The "expectant" treatment in these cases is absolutely false; it may have a specious authority under the title of "conservative surgery." In these cases it is but a veil for cowardice or ignorance. In emergency cases like these there is need of great skill and patience. In simple ovariotomy any tyro can work successfully, but when adhesions obliterate anatomical relations only trained experience can cope successfully with the complications. When such difficulties occur at the hands of men of even large experience, it may be wiser to call in the aid of one more skilled, in the true spirit of surgery. It is not just to the record of abdominal surgery for men without experience to take risks, thereby increasing the mortality and deterring other patients from submitting to necessary operation. Thus there is cast opprobrium on a procedure that, in the hands of trained men, is yet to save thousands of suffering women, and prevent death from traumatic and other injuries formerly pronounced incurable. From this standpoint alone, my argument that only in extreme cases should the abdomen be opened, under any conditions whatsoever, save by the surgeon trained in this particular line of work, is unanswerable.

A REMARKABLE CASE OF NYMPHOMANIA, AND ITS CURE.

By WILLIAM S. STEWART, M.D.,
PHILADELPHIA.

Of the many serious results of the perversion of natural instincts, none produces such demoralization as the habit of "self-abuse." The sexual desire being implanted by the Creator for man's good, in that, properly indulged, it makes of twain *one flesh*, as the man and woman should be first *one in spirit*, the wrong use of this sensation cannot fail of evil consequences to body, soul, and spirit. The history of the following case exhibits clearly the dangerous and degrading effects of this one form of perversion and the difficulties attending a cure. Because the subject is a woman our feelings of loathing are particularly strong, not that this should be so, but familiarity with the facts as to the other sex have unfortunately blunted to some extent the heinousness of the offence in them, leaving us *submissive* as to a necessary evil rather than *aggressive* against unnecessary causes.

Mrs. A., aged twenty-six, was brought to me from the West by her family physician; she was also accompanied by her mother, who gave me the following history: Her daughter aborted with a two and a half months' fetus after having been married six months; no reason could be assigned for this at the time. This was followed by a nervous condition, accompanied by frequent violent outbreaks of uncontrolled temper; all efforts, moral and medical, failed to help her. Further inquiry into her early history elicited the following facts: She was born in a small town of parents physically, intellectually, and morally healthy; surrounded in early life by happy and religious influences. Her mother, although ignorant of the evil practices into which the young sometimes fall, was particular as to the associates of her children. She received her early education at home, and was afterward sent East to a female seminary where she graduated. Shortly after her return she was married to a young man in every way acceptable. Her conduct previous to the abortion was in all respects natural.

I next turned my attention to the young woman, who, on inquiry, denied being guilty of any wrong or immoral habits; but the mother, being awakened to the possibility of such debasing habits, determined to watch her closely. She soon discovered and reported to me, with feelings none but the pure-minded can appreciate, that she had caught her in the act and had decided never to take her back until the habit was broken up. I succeeded in obtaining a complete confession from the young woman, who told me she had learned the practice from a playmate whose home was a model of purity, and that she had been indulging in this way since early childhood.

This confession to me of her habit resulted in an utter disregard of all shame, as she could not use self-control before me, or even her mother since she knew of it. She became so shameless and disgusting that she was kept in a room, her mother whipping her hands at the first movement for sexual gratification. The bromides and chloral were administered; carbolic acid and hydrochlorate of cocaine were locally applied, among numerous other remedies. A pad was constructed stuck full of sharp steel pins and worn over the vulva so that upon any attempt at gratification the jagging might bring her to her senses and aid in the moral suasion, but all to no effect. She was then sent to Atlantic City—it first being necessary to give large and repeated doses of chloral and bromide of potassium to stupefy her in order to insure respectable behavior while on the way.

She was placed under the care of a physician whose specialty is nervous diseases; he was to apply massage and electricity. Within twenty-four hours I received two telegrams; the first to arrange to come and remove her, the second before I could answer, to meet her at a certain train, as he could not tolerate her in his establishment. These negative results seemed to leave us no resource but to deprive her of her ovaries, hoping in that way to remove her perverted instincts.

Urged by the mother, whose devotion was unabating but whose health was visibly effected by the nervous strain, which she bore alone as she kept the discovery to herself, and having obtained written permission from her husband, I removed both ovaries; she made a rapid recovery from the operation. It was found necessary, however, to seclude her for six months, carefully guarded during the time, before there was positive evidence of permanent cure. Her mother reports her as at present in the enjoyment of good health, with no return of her debasing habit, willing and anxious to attend to the management of her home.

A CONTRIBUTION TO THE HISTORY OF OVARIOTOMY ON THE INSANE.

By W. P. MANTON, M.D.,
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Of late the subject of insanity following surgical operations has been brought so repeatedly to the attention of the profession that this condition which, eighteen months ago, would have been considered as of rare occurrence, is now recognized in the light of accumulated evidence as a comparatively frequent sequela of chirurgical practice.

Mr. C. T. Dent, in an admirable paper,[1] mentions three ways by which surgical operations may produce psychical disturbance: 1. By anticipation. 2. By the actual operation, which may cause pain, afford relief, entail shock, etc. 3. By the after-effects. "These," he says, "like the actual operation, may act by producing pain or giving relief, or by setting up septic mischief." He then goes on to say that

> "A still more important factor in producing physical disturbance is mental reaction. The relaxation of control previously exercised, the loosening, as it were, of the mental tension, or the physical disturbance resulting from the removal of a diseased part, which had led to much mental contemplation and called up unduly the subjective qualities of human nature, are all factors which, to say the least, must be taken into account more or less in successful after-treatment. The sea may calm down after the storm has disturbed it, but once in a way wreckage will be seen floating on its surface."

This writer, while not denying that natural or inherited mental instability may be found in the history of some of these cases, believes that in the majority of instances this is not so. My own limited experience does not agree with this, for in the few cases

[1] Journal of Mental Science, April, 1889, p. 1.

which have come under my personal observation there has been a distinct history of a neurosis.

Without entering farther into the discussion of this very interesting subject, which belongs to psychiatry and not to gynecology, I desire to present for your consideration a case which is not only remarkable, but unique. As will be noticed farther on, the cause of insanity in the subject of this record is put down to a trifling operation; some months later a capital operation is performed with complete restoration of the mental balance, but this soon gives place to a condition resembling the first state, differing from it only in degree.

Miss A. M., German-American, single, aged thirty-four, a dressmaker by occupation, was admitted to the Eastern Michigan Asylum December 27, 1888. On the mother's side the family history is good, but the father is reported to have been a heavy drinker, and to have died in his forty-fifth year.

The patient is a small blond, weighing seventy pounds. For several years she is said to have been delicate, and for eight or ten years nervous. In February, 1888, she suffered from abdominal dropsy, and her family physician reports also having found a tumor simulating the spleen. There was likewise an enlargement of the uterus, or a tumor near it. Eleven quarts of a light-colored fluid were aspirated from the abdomen at this time. Following this she suffered much pain, and about a month after the operation contracted a low form of fever, from which she passed into a state of acute mania, frothing at the mouth, barking and snapping at her friends, so that she was thought to be affected with hydrophobia. When she regained her strength sufficiently to go about she became indecent in her language, untidy in her habits, and inclined to assault those about her.

On admission to the asylum she was extremely feeble and emaciated, and much depressed mentally, having delusions of apprehension. For a time there was a slow improvement in her general condition, but she never became strong or had good health. At times she would be very noisy; at others quiet and indifferent, paying no attention when spoken to. One distressing peculiarity in the case was her tendency to fasten onto some sentence and repeat it over and over in a monotonous voice from hour to hour, ending each period with a "Huh." Her appetite was capricious, and sometimes excessive, which may have given rise to her most frequent formula, "A piece of bread and butter, please, huh?" or, "Give me a drink of water, please, huh?"

On January 1, 1889, it was noted that her feet were much swollen the night before, and that her upper eyelids were puffy in the morning. It was thought that she was failing fast, her general condition being precarious. I saw the patient at the request of Dr. Henry M. Hurd, Medical Superintendent, and examined her under ether. She was then quite feeble and

much emaciated. The abdomen was slightly distended by a kidney-shaped tumor, the hilus of which pointed downward. The growth was movable in all directions, but especially upward. It was hard, somewhat nodulated, but fluctuation was not to be obtained. The history of the case, and the general physical signs, led me to suggest that possibly the tumor might be a floating cystic kidney. I was not able, however, positively to exclude ovarian cyst. At my suggestion the patient was put on a tonic treatment and kept in bed a portion of the time. The result was most gratifying: she gained in flesh and improved in every way. It was a question in our minds whether the presence of the abdominal tumor was not responsible for all or a part of the mental condition; and it was decided that while the removal of the growth might have little or no effect on the disordered mind, there could be no doubt that in a general way such operative treatment would be productive of good. I therefore undertook the operation May 26th, kindly assisted by Drs. Burr, Morse, and Lansing, of the asylum staff; Dr. Rouse, of East Saginaw, the patient's family physician, also being present. On opening the abdomen it became at once evident that the tumor was ovarian, and attached below by a long thin pedicle, to the left side of the uterus. It was also fixed above to the diaphragm by a second pedicle (adhesion-band), which was thinner and more vascular than the true pedicle. There were no other adhesions. The growth was thus guyed, as it were, above and below, which permitted considerable motion, particularly upward, as the pedicle was somewhat longer than the adhesion. The right ovary was found to be greatly enlarged and cystic, hence also was removed. The weight of the tumor was five pounds.

Convalescence from the operation was speedy and uninteresting. The mental phenomena presented were, however, remarkable. It was as if the clouds had broken away after a storm, leaving the whole body illuminated by the awakening intellect. She apologized for all the trouble she had caused, and, to the nurse, expressed much concern in regard to her personal appearance. During the succeeding few days her mind was perfectly clear and her conversation rational. She greatly enjoyed talking with the nurse, and seemed to remember much that she had done since her admission to the asylum.

June 2d, her mind became somewhat dull and clouded, and she remained with closed eyes most of the day. From this time on to the 25th of the month her mental condition varied, but she did not lapse to her former state. On June 25th she was allowed to return to her home, as she had several times expressed a desire to do so, and it was thought that the change might be of benefit. The journey was a short one, but the patient was very restless and impatient to reach her destination. Her expectations were not, however, realized: once home, she continued restless—walked about the house, noticing the changes in furniture, etc.—and expressed her disappointment, as things did not look natural. She asked for medicines, such as she had had at the asylum, and wanted to go back.

About four o'clock the next morning, after a very restless night, most of which was spent in walking about the room, the patient suddenly rushed from the house, clad only in her night clothes, and, before those who were following her could interfere, sprang into the well. She was immediately

rescued from her perilous position, rendering herself as much assistance as she could. An hour later she again repeated the performance, and was again rescued. The patient's friends had by this time concluded that the asylum was the best place for their charge, and she was accordingly returned, having been absent somewhat less than twenty-four hours. Her condition since that time has been one of slow mental retrogression toward her former state. Her attendant tells me that she is not as bad as she was before the operation, and she certainly has improved greatly in her physical health. The present indications seem to point to ultimate recovery.

As throwing some light on the etiology of the mental symptoms, it may be mentioned that the patient's urine had been examined during her early stay in the asylum, and a small amount of albumin, but no casts, discovered. This was the condition of a specimen examined the morning of the operation.

June 5th, the specific gravity was 1020, and there was a heavy deposit of phosphates, some pus, and a trace of albumin.

June 22d, the specific gravity was 1016, the amount of albumin considerably increased, while pus, epithelium, uric acid, calcium oxalate crystals, and hyaline casts were present in the sediment. Subsequent examination of the urine gave essentially the same results.[1]

I am much indebted to Dr. Christian for these urinary analyses, and to Dr. C. B. Burr, medical superintendent, for notes of the case.

[1] Since the above was written a sister of the patient has been admitted to the asylum, suffering from melancholia.

NEW OBSERVATIONS CONCERNING THE FUNCTIONS OF THE ROUND LIGAMENTS.

By J. H. KELLOGG, M.D.,
BATTLE CREEK, MICHIGAN.

According to Gray, "The round ligament consists of areolar tissue, vessels, and nerves, besides a dense bundle of fibrous tissue and muscular fibres prolonged from the uterus." Gray makes no mention of the presence of striated muscular fibres in the round ligaments, but Rouget found striated muscular fibres in the areolar tissue covering the outer end of the round ligament, consisting of a fasciculus derived from the transversalis. According to Sappey, "Striated fibres come from the lower part of the inguinal canal, and from the pubic spine, and ascend to the uterus, but generally disappear at the level of the superior strait." Something more than two years ago, wishing to settle in my mind the question of the structure of the round ligaments as regards the presence of striated muscular fibres, I took advantage of the opportunity afforded to examine the round ligaments electrically, in the course of an operation for shortening these structures for the purpose of correcting a posterior displacement. After carefully isolating one of the ligaments, I applied successively, a faradic, a galvanic, and a magneto-electric current of electricity, with the result of obtaining vigorous contractions with each form of current. The ligament contracted in such a manner that it was not only drawn back into the body, but was actually shortened in its length. I observed, also, that the contractions of the ligament were nearly as vigorous when the electrodes were placed, one in the vagina and the other on the abdominal wall a few inches from the ligament, as when they were applied directly to the ligament itself. With the electrodes placed as described, an energetic contraction of the ligament occurred whenever the abdominal muscles were made to contract by closing the circuit. At

the time this operation was performed, I was in the habit of cutting off the redundant portion of the ligament, as directed by Dr. Alexander in his monograph. In order to assure myself that there was no error in the above observation concerning the contractility of the round ligament under the stimulus of electricity, I placed the amputated portion of the ligament upon a moist napkin, and applied the electrodes to the cut extremities. Vigorous contraction, with shortening of the ligament, occurred at each contact. The contractions observed in the ligament were prompt and vigorous, and characteristic of voluntary muscles. A portion of the ligament thus tested was placed in alcohol, and afterward examined microscopically. I found a large fasciculus of striated, muscular fibres. I measured a few fibres, and found them to have a diameter of about $\frac{1}{700}$ of an inch.

Since the above observations were made, I have many times repeated the electrical test, and have frequently seen vigorous contractions of the ligament, although, in a considerable number of instances, no contractions could be obtained.

The above facts justify the conclusion that the round ligaments are contractile structures, at least when in a normal condition, and the fact that the striated muscular fibres of the ligaments are found physiologically intact in adults, and, as I have observed, even in middle life, proves conclusively that this function of the ligaments must serve some purpose which is called into frequent use. Otherwise, the processes of atrophy and degeneration, by which nature removes useless organs, would have obliterated the unused tissues at an early period of life. The question to which I wish to call attention, and one which appears to me to be of great practical interest, is this: What purpose is served by that functional activity of the round ligaments which requires the use of voluntary muscular fibres? The analogous muscular structure in men, the cremaster muscle, seems to serve a useful purpose in relation to the testicles. I have seen no discussion of the functions of the cremaster muscle in relation to the safety or the functional activity of the testicles, but, as I suggested in a paper entitled "Experimental Researches Respecting the Relation of Dress to the Pelvic Diseases in Women," read before the Gynecological Section of the State Medical Society of Michigan, last year, it may be

"the purpose of these muscles to prevent too great dragging down of these organs when made heavy by engorgement with blood when lifting, coughing,

or straining at stool, to which danger they are constantly exposed on account of the connection of their veins and arteries with the large vessels of the trunk. Any one who will take the pains to observe will notice that the testicles are always drawn up during such acts as lifting, or other forms of muscular movement which involve strong contraction of the abdominal muscles so as to produce downward pressure. By this means the bloodvessels are gathered up and folded in such a manner that they cannot become greatly engorged with blood unless they have previously become varicose. I can understand that the cremaster may be of great service to the testicle in this manner.

"Now, let us see how much greater service a contractile round ligament may be to the ovaries and the uterus. Normally, the ovaries are placed above the brim of the pelvis, and wholly out of the current of downward action. The uterus is placed at such an angle with the vagina that it rests upon the bladder, and is forward of the current of downward action, so that little force is required to sustain it in position. In such acts as coughing, lifting, straining at stool, etc., the contraction of the abdominal muscles has a tendency to force the uterus backward and downward. When the fundus falls backward to such a degree as to allow the top of the organ to be engaged by the intestines, it is crowded down into the hollow of the sacrum with very great force, dragging the ovaries after it. By what means is this occurrence prevented in a woman whose uterus remains in a normal position? The round ligaments have received small credit for duty done in this direction. Dr. Alexander pointed out the interesting and important fact that they act as mooring-ropes. This they certainly do; but it is a legitimate conclusion, from my observation, that they are something more than mooring-ropes. The value of the round ligament as a means for the prevention of backward displacement was long overlooked in consequence of the fact that they are ordinarily found in a slack condition. This fact would certainly militate greatly against their usefulness as mooring-ropes, if they act simply as tendinous cords, as the slack is sufficient to allow so great excursions in a backward direction as seriously to endanger the position of the uterus. If, on the other hand, it is conceded that the round ligaments are muscular structures capable of voluntary contraction, and that they do contract at the same time with the abdominal muscles when the latter are thrown into violent action, this difficulty disappears, and we see a very useful purpose in this arrangement. A muscle continually on the stretch loses its efficiency. It becomes tired out, and stretches so as to become useless, or takes on atrophic changes. The normal slack of the round ligaments gives them opportunity to rest. When their services are required the same nervous impulse which produces action of the abdominal muscles calls these muscles into play also. The slack is taken up, and the retreating fundus is snatched forward in time to prevent any harm being done."

Later observations have led me to the conclusion that in many cases the contractile function of the round ligaments serves only to make taut these structures when the action of other muscles tends

to force the uterus backward, thus bringing them into prompt action as mooring ropes anchoring the uterus to the pubes.

The fact that the round ligaments are not always found capable of contraction, under electrical stimulus, does not negative the above view of their function, but rather supports it. The cases in which I have found the ligaments incapable of contraction have invariably been those in which the fundus had for years been fixed in the hollow of the sacrum. The ligaments had been stretched until they were so attenuated and fragile that it was only with the greatest care that they could be drawn out without being broken. The muscular structures had apparently undergone fatty degeneration from lack of use.

While in England recently, I learned another fact of importance in this connection, to which I am especially pleased to be able to call your attention. Dr. Bland Sutton, whose researches upon the subject of pelvic disease in the females of lower animals are so invaluable, informed me that the round ligaments are present in no class of lower animals, with the exception of the higher apes, such as the chimpanzee. These animals, as is well known, while upon the ground, often stand and walk in an erect position, so that in the female the uterus is subject to the same influences which tend to produce a posterior displacement in the human female, consequently require the presence of round ligaments as a precaution. The ligaments are less practically developed in the chimpanzee than in the human female, however, indicating their less importance in this class of animals, or their relatively greater importance in the human species.

Granting the soundness of the above views respecting the functions of the round ligaments, the practical deductions are most important: 1. As regards the prevention of uterine and ovarian displacements; 2. As relates to the successful treatment of these conditions when not dependent upon mechanical injuries of the vagina or perineum.

If our young women were trained in such exercises as develop the muscles of the trunk, particularly those of the abdomen, we should cease to hear complaints of the ruinous effects of stair-climbing. "Pessary mongers," to borrow a phrase from Dr. Tait, would cease to flourish, and gynecologists would find a large part of their occupation gone. Lack of efficient, vigorous muscular

exercise is unquestionably one of the fundamental causes of the growing weakness of American women, and the prevalence among them of pelvic disorders to such a remarkable extent. The peasant women of Germany, France, Italy, and England are not afflicted with disorders of this class to anything like the extent to which our American women suffer. In what is known as the "black country" of England, I have seen girls, young women, and women of middle age, hard at work in the brick-yards, moulding and carrying brick, handling great masses of clay, and engaged in other arduous employments, and without apparent injury. I saw one young woman tossing at arms' length a mass of clay which, when placed upon the scales, was found to weigh seventy-eight pounds. She had worked at the business for a number of years, and considered it a healthful employment. Certainly she appeared to be the embodiment of health, and although she worked with bare feet continually wet with the moist clay, taking no special precautions during the menstrual period, she declared she was perfectly well, and never had a backache in her life. Stanley praises the women porters of Africa as being more efficient and enduring than men. In Germany, the laboring woman not only toils beside her husband in the field, but does most of the drudgery connected with the erection of buildings, such as carrying brick and mortar, removing rubbish, etc.

Lack of development of the round ligaments is, in my opinion, the greatest of all causes of uterine prolapse, retroversion, and retroflexion, leaving out of consideration, of course, cases which are due to injuries received at childbirth. Among eighty cases upon which I have performed the operation of shortening the round ligaments for the purpose of curing various forms of uterine displacements, I have found a large number of instances in which the round ligaments were so attenuated and so fragile as to be absolutely useless. These useless ligaments have invariably been found in women whose abdominal muscles were poorly developed. In women who have been accustomed to active physical labor, whose abdominal muscles have been well developed, I have invariably found well-developed ligaments.

On the day of this writing, I have performed this operation upon a woman of thirty, of German birth. The patient was well developed physically, had all her life been accustomed to active exercise, but for several years had suffered from retroversion as the result of

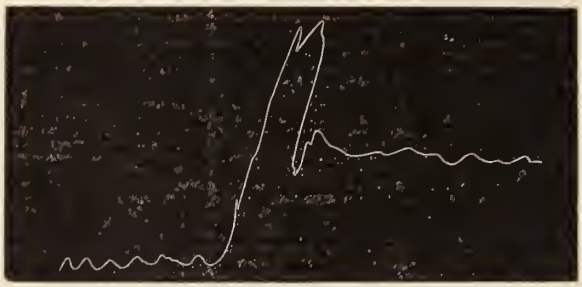
an accident. I found in this case, as would be expected, well-developed ligaments which contracted under the stimulus of electricity. I find myself able to predict, with almost unerring certainty, the condition of the ligaments from an examination of the abdominal muscles. Weak and undeveloped abdominal muscles indicate round ligaments of the same sort.

Among nearly all savage tribes, the women are expected to do the hard work. The American woman is more subject to pelvic disorders of all sorts than her foreign or savage sister. It is certainly not because she is exposed to greater hardships, but because she is less accustomed to those active muscular employments which serve to produce a vigorous development of the round ligaments and other muscular structures by which the pelvic organs are held in place. The natural consequence is that some slight muscular strain, as in lifting, straining at stool, or prolonged coughing, becomes a sufficient cause for the development of prolapsus, retroversion, or some other form of uterine displacement.

Notwithstanding the frequent appearance of medical apologists for that much criticised article of female apparel, the corset, claiming that its use is physiological, we still believe it to be the duty of every gynecologist to wage an unceasing warfare against this mischief-working article of dress. The corset, even when worn so loosely as to occasion no constriction of the waist, produces sufficient pressure to cause disease of the pelvic organs by interfering with normal breathing and impeding the pelvic circulation. It also occasions serious mischief by preventing proper exercise of the muscles of the trunk, particularly those of the abdomen. The round ligaments, as well as the muscles with which they are associated in disuse, become relaxed, inert, and incapable of performing their legitimate functions. A tight corset occasions still greater mischief by forcing the uterus and its adnexa down into the cavity of the pelvis, thus putting the ligaments upon a stretch, as the result of which they soon become weakened, giving way to the continued strain, and allowing the uterus to fall back into the hollow of the sacrum. This effect of the corset is well shown by the accompanying tracings, which were obtained by means of an air-pessary connected with a tambour and a recording cylinder. Fig. 1 shows graphically the great effect of the corset in displacing the pelvic organs. The difference in level between the tracings obtained "without corset"

and "with corset" indicates the difference in intra-pelvic pressure under the two conditions, and the strain upon the muscular ligaments of the uterus. These tracings, with many similar ones,

Fig. 1.

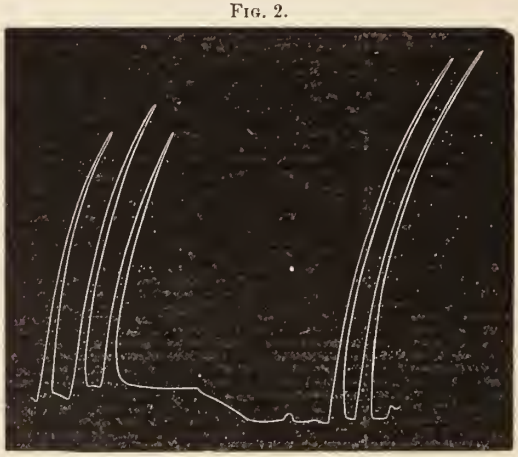


Without corset. Tightening corset. With corset.

were obtained a number of years ago in the course of some studies of the influence of tight-lacing upon intra-pelvic pressure.

Fig. 2 represents the curves produced by acts of coughing with and without the corset. The higher level and shorter curves with

Fig. 2.



With corset. Without corset.

the corset are the result of the strain to which the round ligaments and other supporting structures of the uterus are subjected by the corset. A large number of similar tracings might be presented in

illustration of the same fact, but these I will reserve for another paper.

Voluntary contractility is one of the properties of the round ligaments; and if the view above presented respecting the action of the ligaments in opposing the abdominal muscles be accepted as established, it is evident that the employment of means for increasing the strength of these structures must be an important aid in the successful treatment of a very large number of cases of uterine displacement. What is needed is a current capable of producing vigorous muscular contraction without pain or any considerable degree of discomfort. The constant or galvanic current is not suitable for this purpose, as when employed with sufficient strength to produce good muscular contractions it is painful, and is likely to produce other effects not always desirable. The rapidly interrupted faradic current, commonly employed, is also unsuitable, for the reason that it produces tonic contractions which are not only painful, but do not accomplish the object wished, which is exercise—the only means by which a muscle can be made to grow. Six years ago, while experimenting with different forms of electrical apparatus, I succeeded in obtaining from an electrical machine, used in central telephone stations for the purpose of ringing bells on long circuits, a current of precisely the qualities desired. This machine consists of two permanent horseshoe magnets, with a revolving armature. It produces at full speed an alternating current of about one-half ampère quantity, with an electro-motive force capable of overcoming a resistance of 20,000 volts. Muscular contraction occurs at each alternation of the current, no matter how slowly the armature is revolved, and the contraction is absolutely painless. The patient has no sensation whatever, except that of movement. My usual method of applying the current is by means of a broad sponge electrode placed across the lower part of the abdomen just above the pubis, and a divided vaginal electrode, which can be opened after introduction into the vagina by an adjusting screw at the outer end. By the proper application of this current, vigorous and painless contractions can be obtained in all the voluntary structures employed in sustaining the pelvic organs in position. I have obtained similar results from the use of a slowly interrupted induced current obtained from a large coil of thick wire, run by four Leclanché or Law cells.

I might report many cases in which I have obtained the most

happy results from the use of electricity in this manner. It affords the means of applying a most efficient kind of gymnastic exercise to the supports of the uterus and to the muscles of the lower abdomen, and at the same time does not subject the patient to the perils involved in exercises upon the feet, besides accomplishing the desired object more efficiently than any kind of voluntary exercise, Swedish movements, or pelvic massage could possibly do. Under this treatment, patients constantly remark an increased feeling of strength and relief from pelvic pain. I do not wish to convey the impression that I employ this means exclusively in this class of cases. I always employ such other means as will aid in the achievement of the object sought, giving special attention to gymnastics carefully adapted to each individual case. However, I find no one measure of treatment of greater value than electricity, so applied as to secure vigorous contraction of the round ligaments and their associate structures.

PECULIARITIES OF ABORTION FROM ARTIFICIAL CAUSES.

By HAMILTON A. WEST, M.D.,
GALVESTON, TEXAS.

Artificially indueed abortion appears to me to differ from that due to natural causes in the following essential particulars, to whieh attention is directed:

1. The frequeney of septie complieations.
2. The comparatively small amount of hemorrhage.
3. The liability to expulsion of the fetus minus the plaeenta, with retention and deeomposition of the latter.
4. Contraction of the os after ineomplete emptying of the uterus.

Before elaborating these propositions, let me eite the salient points in some illustrative cases: In one patient there was an irregular fever elosely simulating the malarial form, attended by rigors, anorexia, eoated tongue, nausea, vomiting, and marked yellowness of the skin. There was no uterine discharge, hemorrhagic or otherwise. The fever eontinued sixteen days, when there was a slight hemorrhage, whieh was soon followed by the expulsion of a three months' fetus. The os eontracted; the plaeenta remained behind. Septieemic symptoms eontinued until the uterus was emptied and thoroughly eleansed and disinfeeted.

A few months subsequently, this same woman became pregnant. Upon my refusal to induce abortion, she sceured the serviees of some more pliant practitioner, as she afterward confessed. The second abortion was eharacterized by very similar symptoms to the first. There was the septie fever before expulsion of the fetus, with retention of the plaeenta, and eontraetion of the os. Hemorrhage in this case was freer than in the former, but was comparatively little. After prompt scraping and disinfection of the uterus, the symptoms subsided.

In another case of artificial abortion, the peculiar character of the febrile symptoms was noticeable. The temperature would go up to 106°–107° F., with proportionately increased heart-action. Then the fever would decline to normal, and subsidence of the fever was attended by profuse sweating, the alternate rise and decline of fever taking place several times during the day, but at no regular periods. The septicemic fever did not abate until after the uterus had been emptied and washed out several successive days with a bichloride solution.

In all of these patients there was gastric irritability. In one, the nausea and vomiting were excessive, and the ensuing debility was such as finally to cause death.

The diagnosis of impending abortion becomes a matter of important consideration, and it is easy to see how a mistake as to the cause and character of the fever could be made. This was especially noted in the first case mentioned. The resemblance to malarial fever was marked. The coated appearance of the tongue, the anorexia, gastric irritability, yellow complexion, intermittency of the febrile movement, and residence in a malarial climate, all seemed to point to malaria as the cause. The patient strongly denied the fact of pregnancy. It was eight years since she had been in that condition, and this served as an additional element of doubt in the diagnosis.

Another matter to be observed is the low nature of the fever in some instances. One of these patients was going about the house a great part of the time during which the fever lasted. The slight activity of the septic poison in such cases, is probably due to the slowness with which absorption takes place. Probably, also, the nature of the septic germs may have some influence. The fever may, however, be of a more severe type, as illustrated in one of the cases mentioned. Here the irregularity of the fever, the rigors, the high temperature reached, and the profuse diaphoresis were suggestive of the septicemic origin of the symptoms.

The necessity of a careful examination is apparent when women, during the childbearing period, present symptoms of fever. We should make every effort to determine the question of pregnancy, and if septicemia be present, look out for the complications likely to ensue in abortions artificially induced, viz.: contraction of the

uterine mouth after a part only of its contents has escaped, and the evils arising from a retained and decomposing placenta.

Another lesson learned from these cases is, to be on the alert for impending abortion and septicemia when there is serious gastric irritation otherwise unaccounted for.

Concerning the causes productive of septic poisoning, with its accompanying train of evils: doubtless, most of such cases are due to the criminal efforts to induce abortion; the use of foul instruments, whereby septic germs are conveyed into the uterus, and absorption favored by bungling manipulation producing a solution of continuity of the uterine mucosa, opening up the mouths of lymphatics and capillaries, thus not only conveying the germs to the place where absorption is most apt to occur, but producing the very condition which makes it liable.

The question now presents itself, Why do abortions, criminally induced, oftentimes depart from the ordinary course by the frequent incompleteness of the process, contracted os, retention of the placenta, putrefactive decomposition, and resulting septicemia? We have seen an explanation of the frequency of septic troubles in criminal cases, but why should there be a contracted cervix and retention of uterine contents in such cases? In my opinion, we do not have to go far for a reply to this question. In abortions from natural causes we have, in many instances, fatty degeneration of the placenta; in others, hemorrhagic effusions between the placenta and uterine walls. These and similar causes effect a separation between fetal and maternal structures. Thus, before uterine contractions come on, the tissues are softened, and everything is in readiness for the expulsion which is to follow; in addition to which, the fetus oftentimes, with its envelope unbroken, impinges upon the internal os and partly facilitates its dilatation. These are the factors contributing to the complete and easy accomplishment of abortion from natural causes. How different are the circumstances when the process of intrauterine life is rudely interrupted by the hand of the abortionist. Here there has been no preparatory softening of tissues, no separation of the placenta from the uterine walls. The membranes are, perhaps, broken, the waters drained away, there is no projecting body to act as a wedge in effecting dilatation—hence the frequency with which the fetus is expelled and the placenta left behind.

One word, now, as to treatment. The main points have been mentioned in relating the above-mentioned cases. Non-dilatation of the cervix is a difficulty which meets us at the outset. In many cases, the relaxing effects of chloroform are sufficient to overcome the contraction. If not, a steel dilator will assist. Sea-tangle or *tupelo* tents may be required. These failing, an incision through the posterior lip up to the internal os, is harmless, and will give immediate entrance into the womb, as well as assist in the after-drainage.

It is unnecessary to go into details concerning the cleansing and disinfecting measures requisite, as these points have already been sufficiently elaborated by other and abler hands.

THE ANIMAL SUTURE; ITS PLACE IN SURGERY.

By HENRY O. MARCY, M.D.,
BOSTON.

Investigations upon the origin of means adapted to a given end clearly teach that active minds have already subjected the chief factors to careful analytical study, although certain phases of the problem are ever presenting themselves under new aspects. Dominated by such thought, Solomon taught that "there was no new thing under the sun," and it is quite probable that the animal ligature was known and used by the Egyptian surgeons at a period antedating this wise Jewish philosopher.

The connective tissue of animals was early utilized for a great variety of purposes when it was necessary to secure great strength and high tension. The Homeric poems afford familiar illustration. In the Odyssey, the strings of the old Greek harp are described as made from the twisted intestine of the sheep. The ancient Egyptian harp is said to have been strung in a similar manner. The celebrated Arabic writer, Rhazes, who practised in Bagdad, A.D. 900, describes the stitching of wounds of the abdomen with the strings of the harp, and Albucasis also mentions the stitching together of wounds of the bowel with a fine thread from the twisted intestine of an animal.

The careful student of the early history of surgery finds abundant evidence that the ligature was used as a hemostatic agent at a very early date. Celsus, at the end of the first century, describes the ligature as of ancient origin, and says that it was used by the Alexandrian school of medicine, with the teachings of which he seems to have been familiar. He advised placing two ligatures upon the vessel and dividing it between the points of tying. Galen recommended its use, and Vesalius, in the sixteenth century, mentions the ligature as a relic of the past, greatly underestimated

in value because of the lack of anatomical knowledge. Its first application in amputations, on account of gunshot wounds, was doubtless by Ambrose Paré. At this time, wounds were canterized with boiling oil, in the belief that gunpowder in some way poisoned the wound.

Special studies, however, for demonstrating the value of the material used for ligatures do not appear to have been made in the early history of surgery. Indeed, there is little doubt that, whatever the material used, it was always considered as a foreign body to be ultimately eliminated from the wound, and the material, selected for its strength without special reference to the irritation which might be induced thereby, naturally commended itself in the form of thread, silk, or hemp, which was in ordinary domestic use.

To our distinguished countryman, Professor Physick, of the University of Pennsylvania, is undoubtedly due the honor of having first introduced what is known as the *animal ligature* into surgical practice. His ligatures were made of chamois leather, and he and the late Dr. Dorsey usually rolled their ligatures on a marble slab to make them hard and round. The advantages claimed for the ligatures by Dr. Physick were that, being made of animal matter, they would serve long enough to obliterate the artery and be speedily removed by the absorbents, thus avoiding the difficulty arising from a foreign body, however minute. These ligatures were used in this country to a great extent, and Sir Astley Cooper demonstrated their superiority in his own operations.

"Dr. Hartshorn used strips of parchment for his ligatures. My friend, Dr. H. G. Jamieson, Professor of Surgery in Washington Medical College, Baltimore, has for a series of years been employing the animal ligature in an extensive surgical practise. He has used it in many amputations of the limbs and of the mammæ; he has tied the carotid, the iliac, the femoral, the radial, the posterior tibial, the spermatic, and other arteries, with the buckskin ligature, and in no instance had secondary hemorrhage; and he states that he has never seen anything of his ligatures, and, of course, his wounds have generally healed by first intention. Dr. Jamieson gives to Dr. Physick the honor of having first introduced the animal ligature, but he contends that the practise of rolling, or drawing to harden the leather, is highly reprehensible. He advises to tie the artery with a buckskin ligature very soft and a little

broader than the thickness of the skin, taking care not to tie it too tightly. He states, as the result of his observations and experiments upon sheep, dogs, and other animals, that a capsule will surround the ligature, if the capillary vessels be not much disturbed, or the vessel will be surrounded by an abundance of lymph, and the ligature dissolved.

"The method of Ætius and Celsus, revived by Abernethy, of applying two ligatures and dividing the artery between them, Dr. Jamieson condemns as unnecessary, since by a single flat buckskin ligature, the artery may be obliterated without destroying its continuity. Hence, he opposes all indissoluble ligatures of whatever material; he declares it not only to be unnecessary, but highly hazardous to cut the inner coats of the vessel, as recommended by Jones, etc.; and agrees with Scarpa as regards flat ligatures; but, by the use of the buckskin, has no need, like him, to remove his ligatures on the fourth day. For a very able and interesting account of his views, which are of the highest practical importance, I would refer to the thirty-seventh number of the *Medical Recorder*, published at Philadelphia, for January, 1827."[1]

The limit of this paper necessitates only brief extracts, although the entire paper is worthy of careful study.

"We believe that the animal ligature will secure the patient from all these dangers except one, to wit, the awkwardness of the surgeon; and even in this respect the animal ligature is preferable, not requiring that precision of management essential to the cutting ligature. If the ligature is cut from the leather with care, it will always admit of being tied sufficiently tight, but can never be made to cut the coats, provided it is made of soft buckskin, and not hardened by drawing it. It is less likely to slip when somewhat insecurely applied, because, being elastic and soft, it is spread over a small space of the vessel, and almost immediately adheres by its glutinous properties. It lies more securely, while the cutting ligature, resting on a mere line, and having neither adhesive properties nor the advantage of a small vacuum between the vessel and the ligature, as is the case with the flattish, adhesive ligature, is more likely to slip off. Besides, as we cut off the ends close, there is no risk of pulling them away by an 'accidental jerk of the hand.' In support of these assertions, we have to offer the experience of several years' practice, during which we have used no other than the buckskin ligature, and no such thing as a secondary hemorrhage has ever occurred in our practice, extending alike to cases of aneurism, tumors, and amputations.

[1] Cooper's Medical Dictionary, sixth American edition. Edited by D. M. Reese, M.D. Vol. ii. page 130.

"We are, moreover, decidedly of the opinion that in no case whatever have we had reason to suppose that the healing of a wound, accidental or surgical, was delayed by our ligatures; we never see anything of them after their application." . . . "Mr. Cooper tied the femoral artery in a female, aged eighty, with a ligature of catgut steeped in water, which was cut close, and the wound was healed on the fourth day, and must, therefore, have healed by first intention.

"In many cases, we believe, the catgut would answer as well as the buckskin, but we are confident that a flattish ligature holds best and is most convenient. It may be proper to mention that this case occurred in 1817, three years after Dr. Physick's use of the leather ligature." . . . "If we are right in the opinion which we have just expressed, Dr. Physick is entitled to the credit of bringing into use the best ligature as to the material, but here his claim is at an end." . . . "Dr. Physick and Sir Astley Cooper have shown the advantage of using a substance which will serve as a ligature till the artery is obliterated, and be speedily afterward in the power of the absorbents, so that they will remove it. . . . We will now proceed to point out our own views, and endeavor to support them by experiment.

"First. We believe that with an artery sufficiently healthy to admit of its obliteration by the adhesion of its sides, it is best done by a ligature which will neither cut its coats nor strangulate, except in parts, the true *vasa vasorum*, so that the continuity of the vessel shall not be destroyed, although we obliterate its calibre.

"Second. We believe that if an animal ligature of the proper kind be properly applied the vessel will be obliterated, the wound may be healed by first intention, and the ligature will not cause suppurating inflammation; but in due time, being dissoluble, the whole will be removed by the absorbents. There will be no break of continuity in the artery, the *materia arteriarum* will be removed, and the vessel which, during the state of inflammation and the effusion of lymph, was converted into a cord, will pretty soon afterward be resolved to a flat string of white cellular structure."

"Experiment 1.—Twenty-two days after tying the carotid artery of a sheep with buckskin ligature the wound was found entirely healed, the artery obliterated, upon one side of which was a little yellowish matter which proved to be a portion of the ligature.

"Experiment 2.—Twenty-five days after tying the left carotid of a dog there was seen on either side of the vessel two little yellowish knobs, which proved to be the two ends of the ligature in the state of yellow pulp. The knobs were completely enveloped in a strong membranous capsule, the same capsule enclosing both knobs, and its fibres plainly seen crossing over the artery. . . . On the lower side where the coats were not cut, in splitting open the vessel to examine its interior, there was an actual adhesion of the leather to the inner coat. The string was softened into a pulpy consistence, and near the inside of the vessel was evidently covered with organized lymph, and extended along its edge on one side some distance. When the string was gently pulled, one plainly saw a delicate membrane, passing off

from the artery and ending on the string in fringed extremities. This attachment of the vessel by a new formation existed on both sides of the artery. The capsule covering the knobs, or ends of the string, was fully equal in strength to the outer coat of the artery, and therefore there was no tendency to hemorrhage."

It will be seen that in all the essentials the experiments of Dr. Jamieson, undertaken for a similar purpose, were not unlike those of Sir Joseph Lister, repeated half a century later; and the former at a period when so little was expected of the American people in the way of literary productions, to say nothing of scientific research, that one of England's famous critics asked, "Who reads an American book?"

Dr. Ephraim McDowell, in 1809, tied the pedicle of his first case of ovariotomy with a ligature of buckskin.[1]

In the history of ovariotomy in the United States, by the late Dr. Peaslee, it is stated that Dr. Nathan Smith, Professor of Surgery in Yale College, in 1821, tied the arteries with leather ligatures (narrow strips cut from a kid-glove), which were returned into the peritoneal cavity and the incision was closed, followed by recovery.

Dr. John Bellinger,[2] of Charleston, South Carolina, in 1835, successfully performed ovariotomy, tying two arteries in the pedicle with animal ligatures.

Dr. Thomas Young,[3] of Edinburgh, writes in 1813: "I have often wished to try ligatures, made of catgut, which might be absorbed." Professor Paul F. Eve,[4] of Nashville, Tennessee, wrote in 1876: "I have been in the habit of using the sinews of the deer, for ligating vessels, for forty years. I have never used carbolized spray. The tendons of the deer, dried and torn into shreds, and rolled into ligatures, are what I employ. They are absorbed; I have occasionally used them as sutures, but generally apply silk for this purpose."

These fragmentary experiences, drifting down to us through the

[1] It is probable that Dr. McDowell, and other operators later, made use of fine strings cut from the skin of the deer which had been tanned after the methods of the Indians, then, and for a long time after, in common use. These gave a ligature greatly superior to that cut from skins tanned by the modern methods.

[2] American Journal of Medical Sciences, 1837, vol. xxi. page 380.

[3] Introduction to Medical Literature, 1813, page 418.

[4] Transactions of the International Medical Congress, Philadelphia, 1876. Antiseptic Surgery, by John T. Hodgen, M.D., page 528.

years, teach that there was more or less blind groping after a something that should serve a better purpose than that which the routine of daily practice, in the use of the hemp or silken ligature, afforded. It was reserved for the present generation to make possible a scientific basis for the better consideration of ligatures and sutures in their application to the living structures. In the light of our present knowledge of surgical pathology, the opposition to the ligature in the days of Ambrose Paré, which we have been wont to attribute to the conservatism of ignorance and stupidity, is invested with a new and vital interest. The amputated limb, seared with the hot iron, as a hemostatic, a measure most barbarous and revolting, gave as a result an aseptic wound. Repair was necessarily slow and tedious, but abundant granulation supervened, before decomposition ensued, to protect from septic absorption.

The constricting ligature, the septic, pocketed wound, with little care as to cleanliness, gave such secondary fatal results that we are led to wonder that the innovation of the ligature, in the closing of the great vessels, became the established practice. Had it not been for the frightful dangers from secondary hemorrhage after the use of the cautery, slow healing giving imperfect results, it may well be questioned if even the indomitable spirit of Ambrose Paré could have made the innovation survive his own time.

A deeper philosophy sought solution of the problem, as to the causation of suppuration in wounds, and if its prevention was not within the possibility of the rule, rather than the exception. The studies of Pasteur, Tyndall, our own Jeffries Wyman, and others, undertaken for the solution of the problem of spontaneous generation, brought fruitage to the human race little dreamed of by these wise philosophers.

The genius of Mr. Lister seized upon the application of the thought, and with a patient, investigating spirit, and painstaking toil, worked out the fundamental factors of the *rôle* of ferments in wounds. It was not until rules could be formulated, based upon the scientific deduction that operative wounds should be free from suppurative processes, hitherto considered almost necessary concomitants, that the proper conditions for the study of ligatures and sutures were rendered possible. Of necessity in intimate association with the question of the treatment of operative wounds, arose, *de*

novo, a most interesting chapter devoted to the best means of controlling arterial hemorrhage.

It was clear that the hitherto prevailing method of ligation, leaving the ends of the ligature long, extending from the wound, by so much at least prevented primary union; while cutting the ligature short, and closure of the wound, were fraught ever with disastrous consequences, when the septic ferments were thereby deeply buried. When aseptically applied, the constricting silken ligature too often proved an irritating foreign body, to be ultimately slowly eliminated.

In retrospect, with present knowledge, what seems simple factorage of the problem proved extremely difficult of solution. The conservatism of thought, the prejudices of the large number of the surgical authorities of the time, wedded to present measures, misled by other phases of dominating thought—the so-called vital processes of inflammation, irritation, cell proliferation, etc.—engrossed the subject with many difficulties. The demonstration that fermentation and suppuration in a wound resulted from the introduction of a *something* from without, was the first real step of progress. To eliminate that something was the next problem for solution. It was clearly shown that the torsion of an artery to procure rupture and intrafolding of its interior coat, causes permanent closure of the vessel, and that the living structures, unpoisoned by germ infection, possess the power of easy disposition of the aseptic necrotic portion devitalized by violence.

Histological study demonstrated that the necrosed part no longer underwent the changes which had formerly been supposed necessary for the elimination of dead material, known as suppuration, gangrene, etc., but that the part becomes invaded by living cells which, little by little, produce a local change marked by early disappearance of the necrosed tissue. This naturally led up to the thought, if extraneous animal tissue could not be prepared in a way that, introduced into the vitalized structures, would be followed by a similar result.

Mr. Lister having determined that the safe rule of practice demanded the consideration of every wound, as one primarily infected by the omnipresent atmospheric germ, based as fundamental the principle of the treatment of every wound by agents capable of destroying ferments therein accidentally lodged—the so-called

antiseptic method of wound treatment. To this end he found carbolic acid in varying strength of solution eminently advantageous, pursuing his aërial enemies by impregnating the atmosphere immediately about the wound with a carbolic acid solution in fine subdivision, as spray.

Repeated experimentation taught that small pieces of dead tissue, preserved in carbolic acid solutions, incorporated into the living structures, were disposed of in a manner not unlike the necrosed portion of a twisted artery, and led to the inference that animal tissues properly preserved could be used for the constriction of vessels. In looking about for suitable material of animal type to be used as ligature, the catgut prepared for musical purposes naturally offered itself. It proved comparatively easy, by immersion for a considerable period in a carbolic solution, to render the material non-infective, but, as a soft, slippery strand, it lacked necessary qualities in which to make a secure knot, and by its early softening in the tissues, loosened and thereby failed to secure the end sought. A long immersion in an oily solution of carbolic acid, to which a very little water had been added, produced a material change of structure—a kind of tanning process thereby resulted, which gave to the material the quality of less easy softening in the tissues, as well as retaining a firm knot, which was ultimately disposed of by the surrounding structures.

I know of no series of experimental studies better worthy of admiration, or emulation, than Mr. Lister's experiments undertaken for this purpose upon the lower animals, which the laws of England necessitated his resorting to the Continent in order to make possible. The resulting changes, histologically shown to have taken place in ligatures applied to the vessels of the lower animals examined at different periods, taught that the cell proliferation at first enclosed, and later on penetrated, the carbolized ligature, until, little by little, it became replaced by living connective-tissue cells—a discovery the importance of which is scarcely fully appreciated, even to the present time. Mr. Lister's experiments were limited to the ligation of vessels, and there has resulted from his teachings the surgical treatment of the great arterial system with a safety hitherto deemed impossible. The larger vessels are now tied in continuity, in close relation to their bifurcations, even the greater trunks, with a seeming impunity little less than startling.

Returning in 1870 from my studies at Edinburgh under Mr. Lister, liberally supplied with a variety of the materials which he then advised in operative treatment, I not only made use of catgut for the ligation of vessels, but accident early furnished me the opportunity for a new application of the ligature, in the form of buried sutures. February 19, 1871,[1] I closed the ring, necessarily greatly enlarged for the reduction of a strangulated hernia, with deep sutures of catgut. This I did in order to retain the abdominal contents, because of a severe asthmatic bronchitis from which the patient was also a sufferer. The resultant permanent cure of the hernia, with a marked proliferation of tissue along the line of the buried sutures, led me to inquire if the sutures buried in the part had not been disposed of in a manner similar to that demonstrated by Mr. Lister, resulting about the catgut ligature surrounding the arteries.

I immediately instituted a series of experimental histological studies upon the lower animals, and demonstrated that, along the track of an aseptically buried suture, cell proliferation rapidly supervenes and that new cells invade the softened tissue, and *pari passu* with its absorption, a *living band of connective-tissue cells* replaces the whole line of the suture. If rapidly absorbed, the proliferated cells are minimized; as the process goes on more slowly the change becomes more distinctive until, in young animals, in ten to fifteen days all trace of the suture as such is lost. The value of such reinforcement of the tissue along the line of the sutures became at once apparent in their application to the cure of hernia, and, little by little, I early extended their use to the closure of wounds of every description, publishing, from time to time, my results.[2]

In the pursuance of my studies, I early had occasion to examine a great variety of the specimens of catgut offered in the market, although from the first I adopted what seemed to me the wise pre-

[1] A New Use of Carbolized Catgut Ligatures for the Cure of Hernia. Boston Medical and Surgical Journal, November, 1871, vol. viii. page 315.

[2] The Radical Cure of Hernia, by the Antiseptic Use of the Carbolized Catgut Ligature. Transactions of the American Medical Association, 1878.

Animal Ligatures. Annals of Anatomy and Surgery, 1881, page 232.

The Animal Ligature. New England Medical Monthly, June 15, 1883, page 387.

The Restoration of the Perineum by a New Method. The Physician and Surgeon, May, 1887, page 201; August, 1887, page 359.

caution of preparing my own sutures. In catgut there are, of necessity, certain inherent defects. Its method of preparation is not generally known to the profession, who have rarely questioned the product beyond the condition in which it is offered for sale prepared for the musician. The best of these varieties usually come from Italy, prepared from the intestine of the sheep of the mountainous districts. The small intestine necessarily undergoes maceration until the connective-tissue layer, which, as a loose fibrous sheath, unites the mucous and muscular coats of the intestine, is softened, and can be easily separated in a manner not unlike that practised in the preparation of the intestine of the pig for the making of sausages. This is split by a cork, armed with sharp blades, drawn through the circular sheath, dividing it into sections to produce the desired size. These ribbons are twisted, dried, and oftentimes sandpapered to give evenness to surface, and usually put up in little skeins from twelve to fifteen feet in length—the catgut of commerce.

The connective tissue cells of the fibrous coat of the intestine are irregularly disposed, the fine fibrils more commonly crossing diagonally to the longitudinal axis of the intestine, a wise distribution of this strengthening portion of the intestine to allow considerable change in its shape. When carefully examined, under a low-power lens, the fibres are seen to be irregularly interlaced, not unlike a strip of cloth cut diagonally. The gut, even in the dry state, has a perceptible yield on tension, and every musician knows the care requisite to protect his strings against moisture. Frequent allusion is made in the classics to the care demanded of the bowman in this respect, when it was customary to string the weapon with animal products.

Macerate a piece of catgut until it can be easily unfolded, the above condition is readily apparent. Moreover, its division is rarely uniform, and, when sandpapered, the removal of the irregular projections causes oftentimes large abrasions, or rents. No matter how prepared for surgical use, ultimately the result obtained will depend, in considerable measure, upon the integrity of its structure, since the component cells are, little by little, separated by the penetration of the new proliferating tissue. The long maceration in the first stage of preparation, remaining for a considerable time a putrefying mass, necessarily damages the material, not only by softening the adhesion of the cells, but infecting them with bacteria; and in

the use of the catgut for all surgical purposes it is important, as the first step in preparation, to destroy any germ infection that may remain. After this has been effected, no method which I have tried gives a result equal to that formulated by Sir Joseph Lister.

"Dissolve one part of chromic acid in four thousand parts of distilled water, and add to the solution two hundred parts of pure carbolic acid, or absolute phenol. In other words, I use a one-to-twenty watery solution of carbolic acid, only that the carbolic acid is dissolved not in pure water, but in an exceedingly dilute solution of chromic acid. But, minute as is the quantity of the chromic acid, it exerts, when in conjunction with carbolic acid, a most powerful effect upon the gut. The first effect of the addition of the carbolic acid to the chromic solution is to change its pale yellow color to a rich golden tint. But if the liquid is allowed to stand without the introduction of the catgut, it changes in the course of a few hours to a dingy reddish-brown, and a considerable amount of gray precipitate is formed. If, however, catgut about equal in weight to the carbolic acid is added as soon as the ingredients are mixed, the liquid retains its brightness, and the only change observed is a gradual diminution of the depth of the yellow color; the precipitate, which I presume still occurs, taking place in the substance of the catgut. As soon, therefore, as the preparing liquid has been made, catgut equal in weight to the phenol is introduced into it. If you have too large a proportion of catgut, it will not be sufficiently prepared; if you have too small a quantity, it may run the risk of being over-prepared. At the end of forty-eight hours catgut steeped in such a solution is sufficiently prepared. It is then taken out of the solution and dried, and when dry is placed in one-to-five carbolic oil. It is then fit for use."[1]

It improves by age and is better not to be used until after it has been several months in carbolic oil. The preliminary disinfection of the gut is of the first importance, since preservation of the hardened structure in the carbolized oil may not penetrate to the destruction of bacteria within the strands.

I have elsewhere published[2] in detail the micrococcal infection developing only along the line of the buried sutures, of four consecutive surgical cases, giving evidence upon which I deduce the conclusion that it could have been only to this inherent defect of the catgut, which had been selected from freshly opened preparations, preserved in carbolic oil, which were sent me from London.

[1] In several instances I have known sutures to be ruined by a misunderstanding of the above directions of Mr. Lister, much too large a quantity of chromic acid having been used. It may simplify to remember the quantity is about four grains of chromic acid to a quart of a saturated solution of carbolic acid.

[2] The Surgical Advantages of the Buried Animal Sutures. Journal of the American Medical Association, July 21, 1888.

"A great deal of difficulty had been experienced from time to time in the use of catgut, in the formation of stitch abscesses, and the following methods of preparing silk and gut were put to trial: . . .

"The original catgut, as taken from the carbolic oil, was cultured and found to show organisms in every case." . . .

"It is difficult to understand how germs can live that have been immersed in an alcoholic solution of 1 to 1000 corrosive sublimate, but it is suspected that the hardening of the catgut, prior to complete sterilization, shuts up within the substance of the gut a certain number of organisms, which remain latent until they are placed in living tissues; when the catgut swells, the germs are set free, and stitch abscesses result. . . . Reverdin reports a series of experiments in reference to the sterilization of catgut. He found that crude catgut which had not been kept in fat to preserve it, which was exposed for four days to a constantly increasing temperature, maximum 140° C., and then placed for a day in oil of juniper and kept in alcohol, was aseptic. This he had used clinically for eighteen months with perfect results.

"V. Boret has cultured the catgut preserved by Reverdin in bouillon, glycerine, and sugar at different temperatures, and found that there was no reaction at the end of six weeks. Boret has tried the other methods of sterilizing catgut, and found that bacteriologically and clinically they failed. . . .

"Conclusion.—Small catgut was found, as ordinarily prepared, to be always sterile; large catgut, never.

"As catgut is too valuable a material to be discarded, the writers would advise the method of Reverdin, by heat, which is bacteriologically a good one."[1]

Dr. Macewen[2] published a very interesting article giving his method of preparing catgut, so as to render it more reliable, by immersing it in a watery solution of chromic acid—1 to 5—and adding one part of this to twenty of glycerine. Remove in two months and preserve ready for use in carbolic acid and glycerine—1 to 5. By varying the strength, gut is prepared possessing different degrees of resistance to absorption in the tissues. My own experience of animal sutures prepared in this way has not been satisfactory.

I have also used catgut prepared in oil of juniper and kept in alcohol, but think it inferior to chromicized gut.

Owing to these inherent defects in catgut, in common with other

[1] Ligature and Suture Materials. Medical communications, Massachusetts Medical Society, article xxv. By H. L. Burrell, M.D., and G. R. Tucker, S.B.

[2] Chromic Gut—Its Method of Preparation and Behavior in Living Tissues. William Macewen, M.D., Glasgow. Annals of Anatomy and Surgery, 1881, page 128.

surgeons, I was led to inquire if there were not other animal tissues better suited for surgical purposes.

The tendinous structures of the body present the connective tissue cells parallel and firmly united to each other. Although generally thus disposed, there is considerable variety in the arrangement of the cells, making a parallel separation much more uniform in some tendons than in others. As far as possible, a detailed investigation of animal tendons of sufficient size has been prosecuted with varying success.

The tendons of the hind leg of the moose and caribou, soaked in a sublimate solution until soft, were the first tested. A considerable portion of the tendon may be subdivided sufficiently fine for sutures, in length from fifteen to eighteen inches.

Dr. John H. Gilman,[1] of Lowell, called my attention to tendons from the whale, stating he "had used them with great satisfaction in the ligation of vessels." Specimens were sent me from Provincetown four feet in length and of sufficient strength to draw a cart, but the ultimate fibrils were interlacing, while the whole tendon was interspersed with adipose cells. I obtained ligatures also from the whale tendon which were made under the direction of Dr. T. Ishigure,[2] of Tokio, Surgeon-in-Chief of the Imperial Japanese Army. The mode of preparation is given as follows: "First, a whale's tendon is dissected by the points of needles, and teased out until the fibres look very like those of hemp. Secondly, the longest and finest fibres among them are selected, and they are then spun together as ordinary silk thread." There can be no question ligatures thus prepared are very serviceable, but the specimens furnished me were not suitable for sutures.

The Sioux Indian women in the Northwest taught me, in 1882, their manner of sewing buffalo skins with the tendinous structures derived from the fascia lata of the buffalo, which they preserve for this purpose by drying and smoking. During the present summer, I obtained from Mr. Harry Adams, of the Hudson Bay Company, in Winnipeg, Manitoba, specimens from the fascia lata of the moose prepared by the Indians of the far Northwest Territories, as a substitute for that from the buffalo now extinct, called by them

[1] Boston Med. and Surg. Journal, Oct. 1880, page 433.

[2] The Whale Tendon Ligature as a Substitute for Lister's Catgut Ligature. E. A. Otis, M.D. Boston Med. and Surg. Journal, Sept. 30, 1880, page 331.

Astis. They use it in the dry state, stripping it as they sew, occasionally wetting it in the mouth. Good tendon sutures in any quantity can be obtained from this source. My specimens, however, are not more than fifteen inches long, and are quite inferior to the kangaroo tendon. Some years since, a distinguished Russian surgeon sent me similar specimens from the reindeer, finely divided and slightly twisted. These I prepared and used with satisfaction.

In 1880, Dr. S. G. Simmons, of Charleston, S. C., sent me admirable specimens of tendons from the tail of the fox squirrel, with the statement that he had often used them for delicate surgical purposes with great satisfaction. This tendon is composed of exquisitely beautiful parallel fibrils, which can be subdivided without fraying to the size of fine threads. Their extreme length, however, scarcely exceeds nine inches. Reasoning from comparative studies, it seemed to me highly probable that the kangaroo should possess a tendon, similar in quality, traversing the entire length of the tail. Through the kindness of the late Mr. Alonzo H. Newell, of Boston, for many years a prominent merchant in Australia, I obtained some most excellent specimens. At the International Medical Congress held in London, in 1881, in a paper[1] upon the cure of hernia, I mentioned the use of the tendon suture from the kangaroo and other animals as especially to be commended. Reference to my recommendation of the kangaroo tendon and its value in surgery was some time later made in an Australian publication. This came to the notice of Dr. Girdlestone, who wrote me that he had used kangaroo tendons for some years with great satisfaction, and had published the results.[2]

The tendons should be taken from recently killed animals, quickly sun-dried, and kept dry until ready for further preparation. This prevents primary decomposition, which we have pointed out as necessary in the preparation of the catgut. When soaked until soft they are easily separated as fine as desired, with remarkably little waste, and give threads from the size of hairs upward, and from eighteen inches to two feet in length, exceptional specimens being even considerably longer. The kangaroos

[1] The Cure of Hernia. Transactions of the International Medical Congress, 1881, vol. ii. page 446.

[2] Tendon Ligatures. T. M. Girdlestone. Australian Medical Journal, Melbourne, 1877, vol. xxii. page 356.

are so numerous as to make their skins of commercial value, being sent to the United States in lots each of many thousands, yet it is only with the greatest difficulty and expense that I have succeeded in securing tendons sufficient for my own use, although I have sent *carte blanche* orders to various parties in Australia. I was informed they could be obtained in London, but two years ago the enterprising firm of Grosvenor & Richards, of Boston, searched the London markets without avail. Quite recently, Felton, Grimwalde & Co., of Melbourne, Australia, wrote me that they regularly keep in stock tendons prepared for surgical purposes. I cannot doubt that, at an early date, surgeons will be furnished with the kangaroo tendons, which I fully believe are in every way greatly to be preferred to catgut.

In an interesting article published in 1882 by Dr. Girdlestone,[1] he emphasizes the use of the tendon entire as a ligature rather than suture. "In their preparation they should not be removed from the tail *en masse*, but one at a time, without force, as if split longitudinally they could not be relied on. Every diameter that was required was attainable, so that there was no occasion for splitting; neither should two or more tendons be twisted together, as it destroys their flattened form." The advantage claimed is, that they may be used as flat rather than round ligatures, constricting the artery with less liability of cutting the vessel.

Dr. Dudley,[2] of Texas, has written a most interesting article upon the use of the tendon of the lepus, or mule-eared rabbit, as a material for ligatures and sutures. Dr. Dudley does not state the portion of the animal from which he obtains the tendon, but describes them as, "an aponeurosis of muscles rolled upon each other, susceptible of being torn into minute threads, if so desired." He first had occasion to use the tendon of the lepus as a suture, in the fresh state, in 1881, finding he had no silk in his pocket-case. He has continued the use of these tendons with the greatest satisfaction to the time of his report.

Dr. Bernes[3] published an interesting study upon animal ligatures

[1] The Surgical Uses of Kangaroo Tendons. T. M. Girdlestone, M.D., F.R.C.S. British Medical Journal, February 18, 1882, page 228.

[2] Animal Ligatures and Sutures. H. W. Dudley, M.D., Hillsboro, Texas. Transactions Texas State Medical Association, 1884, page 133.

[3] Animal Ligatures. By Joseph Bernes. Philadelphia Medical Times, August 8, 1874, pages 708–11.

in 1874. Although his experiments were not conducted with the care demanded to-day, yet they are still of interest and importance as original studies. They include a large number of experiments upon the lower animals with gut, both carbolized and uncarbolized, peritoneum cut into strips and rolled, as recommended by Dr. Agnew, and beef tendon dried, split into fine shreds and twisted, as well as silk, which was used as a standard of comparison.

"The extreme non-irritating properties of the tendon, coupled with its capacity for fine division, render its slow absorption of decided advantage, since a vessel can be secured with a strand of it so fine as to produce no irritation, and yet sufficient time elapse before its disappearance to render any danger from secondary hemorrhage as remote as in the employment of silk, by which the vessel is usually severed in the course of a very few days. . . . It will be seen that the tendon ligature fulfils all the requirements set down at the beginning of this paper for a substitute for the material now in use. . . . It is, beyond all doubt, ultimately absorbable, so that a ligature of it can be cut off close to the knot and left in the wound. The tendon is by no means so absorbable as catgut."

The use of animal suture requires the same and the only precautions that are requisite to the successful application of the ligature. It *must be* in *itself aseptic;* it must be *aseptically applied* in an *aseptic wound.* When thus applied, the range of its uses may be extended to all operative wounds. It is difficult to conceive if any possible advantage is to be derived in the treatment of any aseptic wound by leaving it open—the so-called open-wound method.

Before the *rôle* of bacteria in wounds was understood, when it befell from chance, rather than scientific care, that primary union supervened, it is easy to understand how many who dreaded the daily experiences of fermentative material retained in pocketed wounds, not only refused to rely upon drainage with occasional irrigation, as a sufficient preventive of septic poisoning, but they insisted, as far as possible, upon allowing no recess in which purulent material could gather. In order to effect this, the lips of the wound were separated and kept apart by antiseptic dressings, so that the wound might heal by granulation from its very base. This is manifestly safer for the patient, and the result attained is not unlike that from the repair processes which supervene in the secondary healing of infected wounds; but those who advocate this method thereby confessedly acknowledge their lack of confidence in the

modern methods of wound treatment, and their inability to protect wounds from infection.

In rare instances, it has been claimed that the resulting cicatricial union gives an increased strength to the parts involved, an opinion which it seems easy to show is unscientific and contrary to the general consensus of surgical opinion.

If it is correct to assume that the theoretic perfection in wound-treatment, which it is the ambition of the surgeon to attain, means a reunion of the divided parts, the anatomical relationship to be restored and maintained, then the suture holds a higher place in surgery than ever hitherto considered.

If the suture itself is replaced by vitalized structures, then its proper application becomes of the highest importance, the value of which the profession is only recently seeming to begin to realize. Given, as illustration, the joining of a divided retracted nerve, or muscle, and its restoration to subsequent perfect usefulness; the sundered cervical tissues after a hysterectomy where the delicate joining of the peritoneum allows no open wound for hemorrhage or absorption; the reunion of the abdominal wound after laparatomy, where the peritoneum is independently united by a layer of buried sutures, and where the linea alba, or the muscular aponeurosis of the sheath of the recti is carefully rejoined, since the adoption of which method I have not had a single case of ventral hernia; or, again, in the amputation of large tumors of the breast, where the remaining tissues are carefully coapted, so that retention and pocketing of fluid are impossible, rendering drainage not only superfluous but harmful.

I would not underestimate the importance of drainage in wounds that are necessarily septic, and in this class of wounds there is no advantage to be gained in the attempted use of the buried suture.

The recent discussions upon the uses and advantages of the buried animal suture are both interesting and profitable. A valuable article, based upon original observations, was published in Germany by Dr. Werth,[1] in which he advocates the use of catgut, in the repair of the perineum, as an interrupted buried stitch. These were taken between one and two centimetres apart, the gut tied and cut short

[1] Ueber die Anwendung versenkten Catgut-suturen bei Operationem in der Scheide und am Damm. Dr. Werth, Kiel. Centralblatt für Gynäkologie, November 8, 1879, page 561.

upon the knot. In cases where the surfaces to be coapted were large, a second row of stitches was similarly placed. Great care was exercised in making the application under aseptic precautions, and most satisfactory results were obtained.

Schroeder[1] repeatedly used catgut as a buried continuous suture and commended it highly. Dr. A. Martin[2] is less enthusiastic, and says:

"I, myself, have tried catgut sutures according to Werth five times; the results were not favorable, but I must admit that in two of these cases the catgut may have been too old."

Doléris[3] recommended knotting the thread, from time to time, of the continuous suture, and believes the buried gut is absorbed in seven or eight days. He reported to me when in America, in 1887, a still further satisfactory use of buried animal sutures.

Bröse[4] writes approvingly of buried catgut sutures rendered aseptic by a corrosive sublimate solution and preserved in absolute alcohol.

Dr. C. B. Keetley[5] published a valuable article upon the uses of the buried suture. He ascribes to Professor Esmarch's assistant, Neuber, and Professor Küster, much valuable original work with the use of the buried suture, especially in amputations, thereby doing away with drainage. He writes:

"Küster read his paper at the last meeting of the Society of German Surgeons. In the discussion that followed, Esmarch having stated that, with these sunk sutures, drainage-tubes could be altogether dispensed with, he was asked, 'What, after excision of the hip?' He thereupon answered shortly and decisively, 'Yes.'"

In conclusion, he says:

"I have to say that it is only in strictly antiseptic surgery I would venture to recommend the use of these sutures, but that in the case of all surgeons who have faith in the antiseptic theory and practice, they will find in buried sutures an effective and beautiful addition to their methods."

[1] Centralblatt für Gynäkologie, July, 1885.

[2] Martin, Diseases of Women. English edition, page 170. 1888.

[3] Archives de Tocologie, February, 1885.

[4] Centralblatt für Gynäkologie, 1883.

[5] The Buried Suture. C. B. Keetley, M.D. British Medical Journal, May 2, 1885, page 880.

Mr. John Wood[1] writes in regard to femoral hernia:

"Latterly, I have found the use of tendon ligature so satisfactory, that for this operation I prefer it to wire. The wound usually closes over it and heals by adhesion at once, and there is not the pain and inconvenience of the withdrawal of the wire. So far the endurance of the tendon, when buried in the tissues, has been long and satisfactory enough to maintain the cure, which has been watched, noted in some cases about two years."

My own experience with the buried animal suture commenced with its use in the case of hernia above referred to, in 1871, and this, with other cases where the cure was believed to be referable to the buried suture, was first published in the *Boston Medical and Surgical Journal*, November, 1871. In 1878 I contributed a paper on the subject at the meeting of the American Medical Association. In 1881 a further contribution upon the same subject, emphasizing the value of the tendon suture, was published in the *Transactions of the International Medical Congress.*

These and various other articles giving the results and surgical advantages of the use of the buried animal suture and its adaptability to special purposes, were reprinted and widely distributed to the profession, both in Europe and America.[2]

If the premises, which I have assumed in the early discussion of this paper, are correct—that a properly prepared aseptic animal suture, aseptically applied, retains its strength sufficiently long to hold at rest the coapted parts until primary union is effected, and then itself slowly disappears, after having fulfilled this function, to be in a measure replaced by vitalized connective tissue—there can be little wanting to attain the theoretic perfection in the suturing of wounds. The first observations which I published, perhaps

[1] Lectures upon Hernia and its Radical Cure. 1885.

[2] Animal Ligatures. Annals of Anatomy and Surgery, July, 1881, page 232.

Cure of Hernia by the Antiseptic Use of Animal Ligatures. Transactions of International Medical Congress, 1881.

Animal Ligatures. New England Medical Monthly, June, 1883.

The Restoration of the Perineum by a New Method. Journal of the American Medical Association, Oct. 27, 1883. Reprint.

The Surgical Advantages of the Buried Animal Suture. Journal of the American Medical Association, July 2, 1885. Reprint.

The Perineum; its Anatomy, Physiology, and Methods of Repair after Injury. Philadelphia: William J. Dornan, 1889.

A Treatise on Hernia. The Radical Cure by the Use of the Buried Antiseptic Animal Suture. Published by George S. Davis, Detroit, Mich., 1889.

naturally, provoked only incredulity, and the results were considered at best accidental. The evidence already accumulated and presented to the profession, by a great variety of observers in different parts of the civilized world, is now sufficient to substantiate this claim.

Silk has justly held a high place in the esteem of the profession because of its exquisite perfection of preparation, and it has been claimed, if rendered aseptic, that it was equally safe as a buried suture. Mr. Lawrence,[1] the distinguished English surgeon, made many interesting and valuable studies upon the ligation of vessels with silk cut short and buried in the wound. His efforts to minimize what he considered the irritating foreign material are very instructive:

"The method I have adopted consists in tying the vessels *with fine silk ligatures* and cutting off the ends as close to the knot as is consistent with its security. . . . Of the silk which I commonly employ, a portion sufficient to tie a large artery, when the ends are cut off, weighs between one-fiftieth and one-sixtieth of a grain."

He adds:

"Although I have not yet ascertained what becomes of the pieces of ligature after the wound is united, I have never seen abscesses or any other bad symptom occasioned by them."

Mr. Lister early experimented very carefully with silk, steeped in various substances, immersed in melted wax and carbolic acid to render it aseptic. In further proof of its innocuousness, it has been claimed that it is also an animal product, and that the tissues should be capable of assimilating it into their own structures. My distinguished friend, Dr. Pancoast, of Philadelphia, believes the fault lies, in large measure, in the introduction of lead during its preparation, and that hence the use of iron-dyed silk is greatly to be preferred:

"It is innocuous, does not produce suppuration along the track of its thread, and the color adds much to the ease with which it may be distinguished for its removal."

Advantages, doubtless, but the necessity of removal emphasizes the fault in material, and not in the color or the skill of applica-

[1] New Method of Tying the Arteries in Aneurism, etc. William Lawrence. Medico-Chir. Trans., vol. vi. page 156. Cooper's Med. Dictionary, vol. ii. page 129, 1836.

tion, which renders it manifestly unfitted for use as a buried suture.

The general verdict of surgical opinion, and it has certainly been often repeated in my own experience, is that aseptic silk, aseptically applied, may be incorporated into the tissues, but remains encysted, and often, after a considerable lapse of time, causes irritation and is expelled as a foreign body.[1]

The mode of application of the buried suture is of the greatest importance. Without exception it should be a continuous suture, since thus used more perfect coaptation of the parts can be obtained while, as far as possible, knots should be avoided. It is important to minimize the material consistent with careful coaptation. It should join like tissues, periosteum to periosteum, muscle to muscle, deep fascia to deep fascia, and skin to skin, after deep incisions of all kinds. It should support the parts always without any constriction of tissue. Having secured these ends, it matters comparatively little by what manner of stitch it is applied. The opinions of operators will be modified in preference for the methods to which they have become accustomed.

For certain purposes it has seemed to me a manifest gain to include the tissues by a double suture, taken by means of a needle with eye near the point, which allows the ends of the suture to be introduced through the same puncture from opposite directions. This of necessity encloses, and should coapt, but *must not constrict*, the tissues involved. The advantages of this stitch are most apparent in certain operations, and I have especially advocated its use in the closure of the canal in hernia, in suturing the pedicle of uterine and ovarian tumors, and in perineorrhaphy.

For wounds in the intestine, and in resection, I have repeatedly used a double layer of tendon sutures, the Lembert stitch, taken as a continuous, not an interrupted, suture. The finer curved Hagedorn needles are the best. The needle pierces the peritoneum as in the Lembert stitch, entering and emerging about two lines from the sides of the wound. This infolds and coapts the peritoneum evenly. In resection of the intestine, or if an incised wound is long, I take a second layer about one-fourth of an inch outside of

[1] New York Medical Journal, September 14, 1889; pp. 296 and 297. Discussion upon silk ligatures and sutures buried in wounds.

the first, coapting more peritoneum and thereby burying entirely the first line of sutures. Post-mortem intestine thus joined will hold water, and in a well-vitalized subject the effused lymph, in a few hours, entirely covers in the affected part. The advantages of this method are simplicity, rapidity of operation, avoidance of knots, a minimum of manipulation and of injury of the tissues involved, even and sure closure of the parts—all of which are of the first importance to a good result, as well as to the security and non-irritability of the tendon suture.

As far as possible, the suture should cross the wound at right or acute angles and not lie parallel with it. For the coaptation of large wounds, as in amputation of the breast, I have found it a decided advantage to use a running stitch, taken from side to side, both ends left externally free, tension upon which evenly coapts the sides of the wound. Fine tendons are thus introduced in two, three, or more layers, commencing at the very base of the wound.

The skin is evenly coapted by a blind running stitch taken from within outward through the deeper layer only. This evenly unites the edges of the skin, while the suture itself is buried beneath it. The wound is dried, dusted with iodoform, covered with a layer of iodoform collodion, reinforced by a few fibres of absorbent cotton. The ends of the deep lines of the running sutures, after sufficient tension has been exercised to produce coaptation, are fixed in the collodion and cut off.

The subsequent dressing matters little; a soft pad of cotton may give comfort by its support, but if the wound is *aseptic* at the close of the application of the iodoform collodion, it being presupposed that each step has been taken with modern aseptic precautions, *primary union will supervene, and drainage is not only needless, but is a positive disadvantage and danger.*

Aseptic wounds thus treated give really a simplicity of detail which seems surprising when contrasted with the clumsy and bungling antiseptic dressings which this method—the aseptic application of buried animal sutures—is destined to supersede. In conclusion, the *rôle* of the buried animal suture may be accepted as a corollary to antiseptic surgery, upon the basic principles of which it is founded as a scientific deduction.

SOME NEUROSES OF THE MENOPAUSE.

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Puberty and the menopause, end-links in the chain of sexual life, are universally recognized as periods of peculiar nervous instability. The menopause especially, which marks the beginning of the second sexual childhood, occupies a prominent place on the border-line between physiology and pathology, and its completion is characterized by profound structural and functional alterations in the entire organism. Organs which have for years exerted a controlling influence over the woman's life undergo more or less complete involution. The ovaries wither, the Graaffian follicles disappear, the Fallopian tubes are almost obliterated, the uterus returns to its infantile form, the vagina becomes shorter and narrower, and the pelvic bloodvessels and nerves are reduced in size. Nor is this process limited to the reproductive system : the spleen, lymphatic glands, Peyer's patches, and other organs undergo an involution somewhat similar, but less in degree. Elimination from the skin, mucous membranes, and glands is largely increased, and partially compensates for the loss of the accustomed periodical discharges.

Changes so remarkable stamp this period as one of great physiological importance, and necessitate a readjustment of the functional activities of the entire organism, which readjustment is not usually established without more or less systemic disturbance. As a rule, the brunt of these disturbances falls upon the nervous system. Especially is this true of those who enter the climacteric period with a nervous system tainted by inheritance, or broken in health by over-work, over-worry, excessive childbearing, or disease.

The menopause brings prominently into the foreground the protean array of structural diseases and degenerative changes which

attend on the post-meridian of life, in which even ordinary diseases are prone to take on aggravated and phenomenal forms. It is not, however, within the scope of this essay to discuss these abnormal conditions, but to call attention to some of the endless forms of functional nervous disorders which receive scant mention in the text-books, and which, far too often, render this period of woman's life a burden to herself, and one to be shunned alike by general practitioner and gynecologist.

On the threshold of our inquiry we come face to face with the important fact, that there is no one neurosis absolutely distinctive of, or peculiar to, the menopause. On the contrary, the symptoms are precisely such as are met with, at one time or another, during the entire period of sexual activity; yet, the prominence of certain symptoms and the peculiar grouping of others furnish a clinical picture so clearly outlined as to be comparatively easy of recognition.

Engelmann makes the statement:

"That the peripheral neuroses or nerve-pains are more common as constant or pathological neuroses, referable to uterine or ovarian disease; whilst the central neuroses—*psychoses*—more frequently signalize physiological waves, and result from the powerful impressions made by the great epochs in the functional life of woman—puberty, menstruation, parturition, and the menopause."

This generalization loses much of its force from the fact that, in many cases, the neurosal disturbance depends upon some latent or masked disease of the sexual organs, which is incited to activity by the added impulse of the physiological congestion of the several epochs: neither the local morbid disorders nor the normal physiological movement is, in and of itself, sufficient to produce the nervous denouement. The causative influence of the climacteric is, however, abundantly proven in the fact that, without any special change in the local disorder, the symptoms of nervous disturbance, as a rule, promptly subside after the cessation of menstruation and the adaptation of the system to its altered sexual relations. With the menopause safely passed the general health usually becomes better than before, and a comfortable longevity is oftener attained by women than by men.

The inherited tendencies, constitutional and local disorders, peculiar environments, and a host of other conditions are largely con-

cerned in the development of these manifestations and in the special forms assumed by them.

As a rule, a stormy menstrual life presages a menopause full of nervous explosions, and it is generally recognized that those who suffer severely at the beginning of menstruation are very likely to have a similar experience at its closing. For example: a woman who passes through an attack of chorea or insanity at puberty, is very apt to become choreic or insane at the climacteric.

It will save repetition to say here that the mere cessation of the monthly discharges does not complete the menopause. It properly covers the period from the beginning of the decline of the functional activity of the generative organs to the completion of involution, and the adaptation of the general system to the new *régime*. It may be stated as a general law, that all the neuropathics of the climacteric period undergo exacerbations or renewals at the menstrual epochs; or, if they have ceased, at intervals which mark the return of the menstrual nisus.

With these general remarks, I pass to the consideration of a few of the special neuroses of this period, limiting myself chiefly to those which have most often come under my personal observation.

The peculiar nervous instability of many climacteric women is aptly described by that word of recent coinage, neurasthenia, the symptoms of which are so variable and ill-defined as almost to defeat the attempt to marshal them into order.

The psychical condition of the typical neurasthenic at the change of life is peculiar. Excessively mobile in spirit, sunshine and shadow rapidly chase each other over her daily life. She is self-sacrificing in the performance of duty at one time, and, again, is querulous, vacillating in purpose, and capricious in temper. She is oppressed by fears of impending evils, and grows moody, when she becomes a veritable Jacques, "with a melancholy of her own, compounded of many simples, extracted from many objects." She is tortured by bodily pains equally hard to bear. There is scarcely an arrow in the armory of pain which may not be unsheathed at this period. These pains may be seated in any part of the body, but are especially severe and obstinate in the head, under the breast, in the back, and over the ovary.

Tic, migraine, and allied neuralgias are apt to take on unwonted severity, but the head-pain most complained of by climacterics is a

peculiarly distressing feeling of heat and pressure at the vertex or occiput. The heat, when due to vaso-motor changes, is perceptible to others, and the accompanying hyperesthesia of the scalp and muscles of the nape of the neck may be so extreme as to render painful the gentlest touch. With the head-pains, there are commonly associated more or less vertigo and dulness or drowsiness. This is always an annoying sensation, and, at times, is so severe as to cause unsteadiness of gait and give rise to cruel suspicions of intemperance.

The breast-pain is so commonly associated with utero-ovarian irritation, both morbid and physiological, that the belief in an intimate relationship between disorders of the sexual organs and the sixth and seventh intercostal nerves, is forced upon us with the positiveness of conviction. In the climacterie, these intercostal neuralgias reach their fullest development. The pain is usually limited to the left side, is persistent but variable, and there are often recurring gusts of terrific severity.

The association of intercostal neuralgia and herpes zoster is well known. Previous to the menopause zoster, as a rule, is painless; but during and subsequent to this period, it is almost invariably ushered in with violent neuralgia, which is succeeded and occasionally replaced by the herpetic eruption. After the disappearance of the eruption, the neuralgia usually returns with increased severity and pertinacity.

The "irritable breast of Cooper" deserves passing mention as a climacteric neurosis. I have lately met two cases in which the symptoms appeared for the first time at the ages of forty-four and forty-eight years. Besides the excruciating pain, the affected breast often enlarges and becomes so sensitive that the pressure of the clothing is unbearable. Not infrequently small tender nodules form in the mammary tissue, which excite the gravest fear in the mind of the patient, and may even lead a careless surgeon into error.

The characteristic backache is almost always associated with pain and deep-seated tenderness in the region of the ovary. It is most severe in the lumbar region, but radiates in every direction, especially along the spine. The ovarian pain is a source of nearly constant and bitter complaint, and its recurrent paroxysms exhibit a fierceness rarely seen in any other locality.

Coccygodynia, though rarer than some other neuralgias, has

proven, in my hands, to be one of the most severe and obstinate of the neurosal affections of the menopause. One case now under care is attended by various neuropathies, the most annoying of which are recurrent cramps in the calf muscles with tingling and numbness in the entire leg. The pain is burning in character, nearly constant, but like all neuralgias subject to periodical exacerbations. Careful examination by myself and consultants has failed to reveal any pelvic disease or any cause other than the disturbing influence of the menopause.

Hysteria, with its illimitable repertory of disease mimicries, plays an important *rôle* in the nervous disorders of the menopause. Statistics, however, offer slender support to the prevalent belief that this period is especially favorable to the development of hysteria.

Briquet's table only shows 4 out of 436 cases, and Landouzy's 15 out of 351, which originated between the ages of forty and fifty. On the other hand, Scanzoni, approaching the question from the gynecological side, found that 44 out of 207 cases began in the fourth decade, and Amann records the histories of 268 cases, of which 93 originated between the ages of thirty-five and fifty-five. But these figures give a faint idea of the prevalence of hysterical manifestations during the change of life. Few, living under the ban of the neurotic diathesis, escape decided outbreaks at this period. Of the graver forms of hysteria, trance, catalepsy, and paralytic phenomena hold the first place in frequency. Convulsions belong, as a rule, rather to the developmental periods of life. The clinical history of hysterical paralysis is too well known to detain us longer than to emphasize the fact that an atypical case of paralysis occurring in a woman in the forties is always open to grave suspicion.

Visceral neuroses are very common at the menopause, and, while they may involve any of the viscera, those of the circulation and gastro-intestinal organs are the most characteristic.

The disorders of the heart may be grouped in the order of their occurrence, as

I. Palpitation.

II. Disturbances of rhythm { Intermittence. / Irregularity.

With these departures from the normal, there is usually associated more or less precordial distress, and upon this tripod of symptoms

the climacteric builds her ever-present fears of organic heart-disease. These disturbances, as a rule, occur in paroxysms of variable duration and severity, but not infrequently the pain and rhythmic disturbances are nearly constant. Fothergill alludes to the recurrence of these paroxysms at night, waking the patient out of sound sleep, as a common experience of women during the "dodging" period. I recently saw, in consultation, a case in which there was abnormal slowness of the pulse—thirty-eight to forty beats per minute—and skipping of every third or fourth beat. The paroxysms lasted for hours, were always coincident with the menstrual epochs, and were, without doubt, purely functional.

Pseudo-angina pectoris of a severe type is an occasional concomitant of the climacteric. The attacks come on suddenly, usually after physical exertion or mental excitement, but sometimes without apparent cause, and all the symptoms of true angina are faithfully reproduced. The writer's experience has been somewhat exceptional in that the only examples of pseudo-angina which have come under his observation have been in women at the change of life.

The neurosal affections of the vaso-motor system are pronounced. These may be general and local. The latter are more frequent, and consist of flushes, extending over the whole body, or confined to the face or extremities; burning in the head, side, or limbs; erythematous blotches; profuse perspirations, and cold hands or feet.

Women place implicit reliance upon flushes and perspirations as being indicative of the menopause. Tilt, in his analysis of five hundred climacteric patients, records flushes in two hundred and eighty-seven, sweats in eighty-nine, and perspiration in two hundred and one. Frequent flushes of the face are almost always present for a year or more after the artificial induction of the menopause by removal of the ovaries and tubes. "The hot-flashes are sometimes attended with visible flushing of the face, hands, etc., and with distressing sensations of fulness and pulsation in the head, symptoms which are probably vaso-motor in character, but sometimes they are unattended by any such phenomena and, so far as we know, are neuroses of sensation only, and analogous to the many other morbid feelings with which such patients are liable to be attacked." (Putnam.) In some instances the floodings that come so suddenly and constitute such a marked feature of the menopause, should be classed among

the vaso-motor disturbances. In this respect they are analogous to the erythematous patches, ecchymoses, and bleeding from the navel, nose, mouth, and other mucous surfaces, which have been repeatedly observed at the physiological crisis in woman's sexual life, the neurotic nature of which cannot be doubted.

Gastro-intestinal neuroses are rarely absent. Gastralgia and enteralgia, though less frequent than in earlier life, are by no means rare at the menopause, and are usually associated with superficial neuralgia of the abdominal walls. Gaseous distention of the stomach and intestines, belching, a peculiar feeling of faintness and sinking at the pit of the stomach (gangliapathy of Tilt) are most characteristic of the climacteric period. Nausea and vomiting, common neuroses in pregnancy and certain other conditions, are rarely met with at this period. The flatulence is ordinarily greatest during the catamenia or at the abortive attempts which replace it, though more or less distention persists constantly. The epigastric faintness and accompanying dizziness are common and distressing feelings which are credited with considerable diagnostic value by many authors.

Pseudocyesis or spurious pregnancy is a curious sexual neurosis, not limited to the menopause, though rarely found at any other time of life, and is always associated with morbid or physiological utero-ovarian irritation. It occurs in greatest frequency in those who have been long sterile, or who have married late in life when the sexual fires burn fitfully. Sims never met with it in women under thirty-eight or over forty-eight. Pseudocyesis does not properly include the fears born of a stolen intercourse, or feigned pregnancy for mercantile purposes, or the delusion of childbearing so common among the climacteric insane. In typical pseudocyesis all of the symptoms of a normal pregnancy and the order of their appearance are simulated with life-like exactness. But under an anesthetic they speedily disappear; the movements of the fetus and the tumor resolve into intestinal gas and fat in the abdominal wall, forming what Baillie humorously called "a double chin in the belly," and the vaginal examination shows the uterus and its annexes to be undergoing the usual atrophy. Thus vanishes the fond delusion that they are "as ladies who love their lords should be."

By far the most lamentable of the nervous affections incident to

the menopause is *insanity*. The great prevalence of mental disease at the time of life when the menopause usually takes place is generally admitted, but the extent to which its occurrence is influenced by the climacteric state is variously estimated by different writers.

Dr. Merson, of the West Riding Asylum, who has carefully considered this phase of the problem, says:

> That the period of fifteen years, from forty to fifty-five, though it does not furnish the highest actual number of cases, gives the highest ratio to the number of persons of that age living, and is, therefore, more prone to insanity than any other period of life. How far this result may be due to causes connected with the climacteric change it is difficult to say, but the sudden diminution in the proportion of attacks after the fifty-fifth year, would seem to point to the withdrawal of some powerful predisposing or exciting influence about this time, which corresponds with the period of cessation of the menstrual function in a large number of women.

The records of the Dayton Hospital for the Insane, with which the writer was at one time officially connected, show that over twenty per cent. of the female admissions during the past thirty-four years were between the ages of forty and fifty. When the absence of puerperal causes is taken into account, which are computed to furnish one out of every eleven insane women, the significance of this statement is apparent. Undoubtedly, there are other factors in the causation than merely the nervous instability which attends this period of life. Many women have struggled on for years weighted down by hereditary predisposition until, at this period, when physical infirmities press heaviest and the reserve forces are least, the mental health gives way under the added worries and hardships of life. The following description is drawn from an analysis of seventy cases of insanity originating at the change of life, and observed in private practice or taken from the records of the Dayton Hospital for the Insane. Hereditary predisposition was found to exist in thirty cases, or about thirty-three per cent. of the whole number. Excluding those—twelve in number—in whom no satisfactory family history could be obtained, the percentage of those hereditarily predisposed was over fifty per cent. While the records of the asylum are not complete, there is no evidence to show that the liability to insanity was greatly influenced

by the number of children the woman had borne. Comparatively, attacks appeared to be as frequent in those who were single as in those who had borne large families.

Climacteric insanity is, as a rule, gradual in its onset. In a majority of cases the mental disease became apparent during the irregularity that preceded the final cessation of the menses. In five the mental symptoms were the first indication of the menopause; in six the insanity was suddenly manifested after a terminal flooding. In a few cases the mental disease was not pronounced until from one to six months after the final appearance of menstruation. In two sisters chorea developed simultaneously with the mental disease. They both died demented, the chorea persisting to the end of life.

Classifying the cases in the customary manner we find: mania, ten cases; melancholia, forty-eight cases; melancholia with paroxysms of excitement, twelve cases. Pure mania is, therefore, of comparatively rare occurrence. Two cases of mania were found among those already alluded to in which the mental symptoms came on suddenly after a terminal flooding. In twelve cases periods of excitement were associated with the melancholia. These paroxysms were usually transient in duration and followed by the deepest melancholia. They were marked at the regular monthly periods, even after the cessation of the catamenia, but more especially on their reappearance after a short absence.

The liability to a recurrence of insanity at the menopause, in those who have experienced previous attacks, is very strong; nearly one-third of the cases had such a history. These recurrent attacks furnish a large share of those exhibiting the symptoms of mania and the recurrent periods of excitement.

Profound melancholia was the form of disease assumed in about eighty per cent. of the cases. Two classes may be recognized. The members of the first group show in the early stages of disease, perversion of the affections, distrust of friends and relatives, which soon ripens into marked delusions of persecution. They refuse to eat for fear of being poisoned, and are suspicious of every proffered kindness. They are haunted by an ever-present fear of some impending evil, which partially explains their restlessness and frightened appearance. As a direct outgrowth of these

delusions homicidal impulses are nearly always present. The members of the second group, which is the larger, consider themselves the authors of their own misfortunes, and believe their sins have barred them from God's mercy. They bewail the commission of the unpardonable sin, which is oftener a sin of omission than commission. The personal appearance of the patient vividly portrays her depressing thoughts. Her countenance is furrowed with the lines of sorrow and despair. Negligent in dress, she paces her room wringing her hands, and lamenting her unhappy lot. She is driven about by a vague sense of restlessness—a desire to go, whither she neither knows nor cares, but hopes against hope to escape from her feelings. These delusions are associated with suicidal impulses. At least sixty per cent. of the cases recorded here were suicidal, many of whom had made repeated and desperate efforts.

The prognosis of climacteric insanity is more favorable than in any form of mental disease, excepting puerperal mania. Of the seventy cases analyzed in this paper, twenty-nine, or over forty per cent., recovered. About two-thirds of the recoveries occurred within eight months from the beginning of the attack.

In conclusion, the important question presents itself as to the relationship existing between diseases of the sexual organs and the various neuroses of the menopause. That this relation is a close one is proven by the immense number of recorded cases which have borne the crucial test; *i. e.*, prompt amelioration of the nervous symptoms upon removal of the utero-ovarian disease. The time allotted this essay prohibits the introduction of illustrative cases, which is, however, the less a source of regret since, doubtless, the note-books of all present offer abundant confirmation of the propositions advanced. There can be no doubt that, in many cases, the nervous disturbances are aggravated by morbid conditions of the pelvic viscera. Many women who suffer severely at the change would escape with little inconvenience, were it not for the superadded irritation of the pelvic disease.

But, on the other hand, the cases are not few in which the neurotic affections exist independently of all complicating disorders of the sexual or other organs of the body, the peculiar nervous instability of the menopause being alone responsible for the symptoms. Perhaps it may not be amiss in an Association where every disease

is viewed through gynecological spectacles, to suggest that, in some cases, the pelvic symptoms themselves are *caused by*, not the *cause of*, the nervous disorders. The vicious circle begins in the nerve centres, not in the pelvic viscera. To ignore this fact and consider the latter alone is wholly to misinterpret the neuroses.

SAPREMIA AND SEPTICEMIA DURING THE PUERPERAL PERIOD.

By WILLIAM S. GARDNER, M.D.,
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All the standard works on obstetrics, and nearly all the works on general surgery, speak of sapremia and septicemia in such a confused and general way, that any one who does not see more of them than usually falls under the observation of the general practitioner is not able to distinguish between them. It is true that, both in etiology and symptomatology, they have many points of similarity; but there are also wide differences by which it is no very difficult matter to distinguish them from each other; and it is time that this should be done. The time for calling every rise of temperature subsequent to parturition puerperal fever is past.

It is, of course, out of the question, in a paper like this, to attempt to show the differential points of all the fevers of the puerperal period; and it is sincerely hoped that this attempt to draw the lines between two of the diseases of this period will not add confusion to what is now little short of chaos.

I do not believe in an essential puerperal fever. Sapremia and septicemia are the diseases most frequently spoken of under that title. I believe that these diseases are the same as when they follow any other accessible solution of continuity. In sapremia there is simply septic intoxication. The microorganisms that produce the poisonous compounds to which the symptoms are due are not themselves taken into the system. Septicemia is a true infectious disease. In it microörganisms capable of multiplying within the body are taken into the system, and *there* increase in number and produce the poisons to which the symptoms are due. Sapremia is a perfectly man-

ageable disease. Every case properly treated will recover. The records of septicemia under all treatments show a very great mortality.

To follow up these points, I will take what I consider a typical case of each disease, and give its different phases in as much detail as space will allow. The case-notes will be made very brief:

Laura W., aged eighteen, colored, primipara, was confined October 8, 1887. She was delivered, by forceps, of a child weighing nine pounds. There was considerable post-partum hemorrhage, which was checked by the intra-uterine injection of hot water. The patient was weak, but otherwise there were no unfavorable symptoms until the evening of the third day, when the respirations were 36, pulse 120, and temperature 102° F. A vaginal injection brought away several blood-clots.

The morning of the fourth day the respirations were 34, pulse 142, and temperature 104°. The uterus was soft, relaxed, and extended to the umbilicus. There was no pain or tenderness. The milk was suppressed. The lochial discharge was quite offensive to smell. An intra-uterine injection brought away a large quantity of dark colored, offensively smelling blood-clots. Ergot was given to contract the uterus. The fifth day ergot, antipyrin, and vaginal injections were used. The sixth day another intra-uterine injection was given. The matter washed out at this time was smaller in quantity and much less offensive than that of a few days before. After this she was given vaginal injections and an occasional antipyretic, but there was nothing of special interest during her convalescence.

Now compare the above record of a case of sapremia with the following notes on a case of septicemia:

Emma S., aged twenty-eight, white, was confined with her fifth child, March 7, 1886, about 9 P.M. The first stage of labor was eighteen hours; the second one hour. There was nothing unusual about the labor. The next morning the pulse was 100, and the temperature 101°; that evening the pulse was 104, and the temperature 102.5°. The uterus was rather large but firm, and slightly tender on pressure.

The second day after labor the pulse had risen to 120, and the temperature to 103.5°. The area of tenderness had increased, and, from this time on, it continued to extend until it included the whole abdomen, which at the same time became much distended. The uterus remained contracted. There was no offensive lochial discharge. The pulse at all times was very feeble. The mind was clear. Antipyretics would reduce the temperature only temporarily, but did not affect the pulse-rate. Opium was given to relieve the pain.

Until the morning of the seventh day after confinement, the pulse varied from 112 to 128, and the temperature from 101.5° to 103.5°, the latter being the highest recorded temperature up to this time. The evening of the

seventh day the pulse was 160, and the temperature 105°. She died at 10 P.M., or just one hour more than a week from the time of delivery.

Predisposing Causes.—The predisposing causes of both diseases may be mentioned together. One cause frequently spoken of is post-partum hemorrhage. My experience does not confirm the belief that post-partum hemorrhage predisposes to other serious puerperal troubles. The records at the Maternité show that no larger per cent. of women who had considerable post-partum hemorrhage were attacked by febrile disturbances than those who had had no such hemorrhage. If the theory of blood-letting is correct, we would suppose that a considerable hemorrhage at this time would be rather advantageous than otherwise. I doubt if it has any direct influence; but it is self-evident that where a disease is engrafted upon a constitution already weakened by hemorrhage, the patient has that much less power of resistance.

Much has been made, also, of the mental condition of the patient. It has been repeatedly affirmed that girls who had been seduced were especially apt to have some form of puerperal trouble; that the depressing effects of grief and shame made them more vulnerable. I have no doubt that such emotions, in so far as they interfere with nutrition, do exert an injurious influence. But the extent of the injury has been much over-estimated. In the hospital wards I have repeatedly seen those who had no other fault than that of being poor, do badly after confinement. And I have seen those who had every cause for shame, who considered themselves forever disgraced, who declared that they did not wish to get well, that their prospect in life was not worth the living, recover promptly. It should be borne in mind that among the earliest symptoms of some of the puerperal diseases are despondency and other abnormal mental conditions, and that very often these mental disturbances disappear promptly when the material cause is removed. These observed facts have made me very sceptical on the subject of the influence of the mental status on puerperal disease.

Some of the acute infectious diseases have been thought by many to have a direct causative relation to puerperal fever.

Scarlet fever, diphtheria, and erysipelas have been considered the chief offenders. But statistics show that the death-rate of women in the puerperal period who are affected by scarlet fever and diphtheria is about the same as for other conditions. Women have been known to suffer an attack of facial erysipelas during the puerperal period, and not have any form of puerperal septicemia (Lomer). Of course, it is not doubted that erysipelas can be communicated to the lacerated surfaces about the genital tract as easily as it can be to any other place.

I think that the great source of danger is *not* the inoculation of the specific germs of these special diseases, but that the principal source of danger is in the communication, to the genital canal at a time when its surfaces afford ready means of inoculation, and when the recent stretching has reduced to the minimum its resisting powers, of the microörganisms present during the suppuration accompanying these diseases.

Robert Barnes and Galabin lay much stress upon auto-infection—that is, the poisoning of the body by the products either from retained placenta or membranes, or by the products formed during involution. I cannot understand how this can be true. In the first place, parts of the membranes or placenta, or even the whole of both, have been known to be retained in the uterus without undergoing putrefaction for many days, and without producing any unfavorable symptoms. In the second place, the products formed during involution are present in all cases, and if they can cause any puerperal fever they ought to do so whenever present. Involution is essentially a fatty degeneration. The same process is often met with in other parts of the body, and is then never considered a cause of any febrile disturbance. I do not think it justifiable to believe in any true auto-inoculation.

The fact that fevers of the puerperal period are much more common in winter, points to the atmospheric conditions as having some causal relation. In all probability the actual change of temperature does not make the difference, but it is simply the bad ventilation. The improper air-supply favors the accumulation and propagation of infectious material. If all hospitals and lying-in chambers were properly ventilated,

no doubt the undue proportion of cases occurring during the later winter months would disappear.

Blood-clots, and portions of membrane and placenta retained in the uterus, are perfectly harmless. It is only when they decompose that they become harmful. This process of decomposition may begin at any time, but it cannot begin until some element from the outside has been added to the retained material. Since there is always a possibility of the addition of the lacking element and the subsequent decomposition, these retentions are always elements of danger.

The immediate causes of sapremia and septicemia must be considered separately.

Immediate Causes of Sapremia.—In sapremia we have certain microörganisms acting upon retained portions of placenta, membranes, blood-clots, or lochia; the decomposition of the matter retained, and the absorption of the products of this decomposition into the system.

Concerning these statements three pertinent questions may be asked: First, What is the evidence of the presence of microorganisms? Second, What is known of the chemical nature of the compounds formed by the action of these microörganisms? Third, What is known of the poisonous effects of these compounds?

The evidence of the presence of microörganisms is abundant, and is either direct or indirect. Directly, they have been found by all observers who have examined decomposing animal matter microscopically. Indirectly, by establishing the fact of the presence of putrefaction. The simplest definition of putrefaction is, the decomposition of albuminoid compounds under the influence of moisture, warmth, and certain microörganisms. The albuminoids present may be in the form of placenta, membranes, blood-clots, or lochia. The two conditions of warmth and moisture are always present in the living body. So that the very fact of putrefaction is positive evidence of the presence of microörganisms. The putrefaction in many cases can be discerned by the odor of the hydro-sulphuric acid and ammonium compounds evolved. And I expect to be able to show further on that the toxicological effects of some of the

amines and amides produced during the putrefaction are of themselves evidence of albuminoid decomposition.

Much labor has been expended by Brieger, Gautier, Vaughan, Pauchet, Scheurlein, Grawitz, and many others, in studying the compounds formed during putrefaction. It is true that the compounds formed during the first few days of putrefaction have not been worked up so carefully as those occurring later in the process. But enough is known to show that certain alkaloidal compounds are formed at all stages, and that these animal alkaloids or ptomaines differ according to the micro-organism present and the length of time the process goes on.

A short sketch of a few of the best-known ptomaines will help clear up the subject.

For example, cadaverine, $C_5H_{14}N_2$, has been obtained by Brieger from human hearts, livers, and lungs, which had been left to putrefy in a warm place for three days. It seems to be constantly produced by the comma bacillus without reference to the particular soil. The investigations of Scheurlein, Grawitz, and others, show that cadaverine is capable of producing inflammation and necrosis.

Gautier and Etard obtained a base, $C_8H_{13}N$, from the decomposing flesh of the horse and ox. They consider it a constant product of putrefaction. It is an alkaline, almost colorless, oily liquid, and possesses a strongly penetrating odor. A dose of 0.0017 gramme injected under the skin of a bird produced marked unsteadiness of gait, paralysis, and finally, death. The pupils were normal, and the heart stopped in diastole.

Vaughan says of mydaline, another of these bases, that it

has an entirely specific action. Small quantities injected into guinea-pigs or rabbits produce, after a short time, moistening of the under lip and an abundant flow of secretion from the nose and eyes. The pupils dilate gradually to the maximum, and become reactionless; the ear vessels become strongly injected, and the body temperature rises one or two degrees. During the action of the poison the animal shows a tendency to sleep, and peristaltic action of the intestines is heightened. Large doses (0.05 gramme) induce an exceedingly violent action which invariably results in death. On post-mortem examination, the heart is found stopped in diastole, and intestines and bladder contracted; otherwise nothing abnormal is found.

Ptomaines and their salts, like other bodies of a similar chemical nature, readily pass through animal membranes.

This fact explains their ready absorption into the system from any cavity containing them.

It is not claimed that cadaverine, or mydaline, or any special ptomaine is the cause of the symptoms of sapremia, but that the process going on in the parturient canal in this disease being identical with that which produces these ptomaines, it is certainly fair to presume that similar compounds are there produced, and that the symptoms are due to the effect of these ptomaines on the body after they have been absorbed.

Immediate Causes of Septicemia.—It has been stated that septicemia is an infectious disease—*i. e.*, "a disease which is caused by an invasion and reproduction within the body of pathogenic microörganisms" (Welch).

The earlier observers lost much time, and caused not a little confusion, by not differentiating the organisms of putrefaction which are comparatively harmless when inoculated into the body from those microörganisms which, when introduced into the body, multiply there, and produce septicemia or other infectious disease, as the case may be.

One of the first to direct attention to this field was Mayerhofer. In 1865 he found that the lochia of infected women contained microörganisms, which he considered the cause of the decomposition. In 1869 Coze and Felz found in the blood of a patient suffering from puerperal septicemia, "round corpuscles arranged in the form of chains." Afterward Rindfleisch mentions having found microörganisms in the muscular structure of the heart. These observers have been followed by Recklinghausen, Waldeyer, Orth. Klebs, Wolff, Pasteur, Ehrlich, Fränkel, Carl Lomer, and others. There is no mention of any of these observers failing to find the chain-like micrococcus. All succeeded.

Coze and Felz injected hypodermatically the blood from septicemic patients into rabbits. A majority of the rabbits died of diarrhea and convulsions. If the blood of one of the infected animals was used the same symptoms were noticed. In this blood was found the chain-like micrococcus.

Eberth and Orth inoculated the corneæ of rabbits with material obtained from puerperal septicemic patients and

found upon examination microscopically the chain-like micrococci.

There is no method, as yet known, by which the chain-like micrococcus of puerperal septicemia can be distinguished from similar microörganisms found in scarlatina, diphtheria, and erysipelas. But this fact argues rather that the present methods of investigation are defective, than an identity of the microörganisms.

Carl Lomer, of Berlin, in writing of "The Relations of Microörganisms to Puerperal Fever," gives the following recapitulation:

I. The chain-like micrococci have frequently been found both in the exudations and in the organs of patients having died from puerperal fever.

II. All observers have noted the same characteristic variety.

III. Different species have hitherto never been discovered.

IV. It seems as though all who sought for them have been able to find them in every case.

V. More recent researches have shown that besides the chain-like micrococcus, other microörganisms—*i. e.*, bacteria—can be found in puerperal fever.

How the microörganisms produce the symptoms which accompany their presence is an interesting question. It is extremely probable that of themselves they do no harm, but that it is through certain poisonous compounds generated by them that they produce the symptoms. After they are once within the body their action is, in all probability, much the same as that of the microörganisms of some of the other infectious diseases which have been carefully studied.

For example, by the cultivation of Koch-Eberth's typhoid bacillus on beef broth, from eight to fourteen days at a temperature of 37.5° to 38° C., Brieger obtained typhotoxine, $C_7H_{17}NO_2$. When typhotoxine is injected into a mouse or a guinea-pig there are at first salivation, and increased respiration; then the salivation increases, the heart and respiration become weaker, the animal has diarrhea, the pupils dilate, and the animal dies in one or two days.

Tetanine, $C_{13}H_{30}N_2O_4$, is a similar substance. Brieger has obtained it by cultivating the impure tetanus microbes of Rosenbach in beef broth. More recently Brieger succeeded in obtaining tetanine from the amputated stump of a patient

suffering from tetanus, the physiological and chemical reactions of which are identical with those of the compound formed by the cultivation of the microbes in beef broth. This base when injected into animals produces all the characteristic symptoms of tetanus.

While it has not been demonstrated, it is probable that the chain-like micrococcus of septicemia produces basic substances similar to those shown to be produced by the typhoid bacillus and the microbe of tetanus, and that it is these basic substances that really produce the symptoms.

Symptoms of Sapremia.—The symptoms of sapremia come on after the end of the second day and, as a rule, before the fifth; near the end of the third day being the most common time. There may or may not be a chill. When there is a chill it is not usually followed by others. The temperature rises at once often to 105° F., and in nearly all cases above 103°. The pulse is rapid, varying from 100 to 140 per minute. For some days there is maintained a certain relation between the pulse, temperature, and respiration. Any agent that reduces the temperature also reduces the respiration and pulse rate. The temperature does not follow any regular diurnal change but fluctuates greatly. The possibility of drainage affects the temperature more than anything else. The condition of the skin is not constant; in some cases it remains cool, in others it is hot and dry, and in still others, though rarely, there is considerable sweating.

In some cases the brain does not seem to be affected, but in many with the higher temperatures there is somnolence. One patient under my care would sleep continuously. She could be roused without much difficulty, and when awakened her mind seemed perfectly clear, but she dropped to sleep immediately upon being left undisturbed.

The uterus is large, so flabby that it is difficult to outline it through the abdominal walls, and extends to or above the umbilicus. It is not painful on pressure. The intestines often become distended causing tympanites, but there is no pain or tenderness in any part of the abdominal or pelvic cavity.

In most cases the lochia has an odor of putrefaction. The absence of this sign should not be looked upon as precluding

sapremia. Where it is marked it is of very great importance, but there are many cases in which the odor, if any, is so slight that it will escape detection. This especially is the case where antiseptic vaginal douches have been used.

In cases in which the milk-flow has been established before the beginning of the fever it is suppressed. In cases where the fever begins before the milk-flow, the flow does not begin at the usual time. In a majority of the cases the milk-flow is again established after the recovery of the patient.

Symptoms of Septicemia.—The first symptoms come on, as a rule, very soon after confinement; most often within twenty-four hours; more rarely after forty-eight hours have elapsed. There may or may not be a chill. The first rise of temperature is usually not over 101° or 101.5°. Within the first few days the temperature may run to 102.5° or even 103.5°; the latter figure is very high. Just before death, or after, there is set up a secondary sapremia; the temperature may run up to 105° or above that. The pulse from the beginning is rapid, 120 to 160—and very small. The respiration is hurried. If the temperature is brought down by ordinary antipyretics, the pulse does not fall accordingly. There is quite early over the uterus more or less tenderness, which extends as the disease progresses. The uterus may be quite large but firm. The abdomen becomes tympanitic and tender. The extremities are cold; the mind clear. The lochial discharge in many cases is apparently little changed or suppressed. In some cases the lochia may be decomposing, but not as a rule. The face is pinched and has an anxious expression.

Contagiousness of Sapremia.—It it claimed by the majority of writers that what is called the "autogenetic form of puerperal fever," by which misnomer puerperal sapremia is sometimes known, cannot be communicated from one patient to another. Dr. Barnes says: "The autogenetic forms proper did not appear to possess the active powers of propagation. For example, a common form, that which rose from a decomposition of the placenta setting up a septicemic fever generally began and ended in the patient attacked." Dr. Fordyce Barker quotes the above, and adds, "On this point my own experience and observations are in entire accord with Dr. Barnes."

Galabin says: "Where there is septic intoxication or sapremia only without infection there can be no contagion."

While we have good reason for believing that sapremia is not contagious to the degree that septicemia is, still it should not be forgotten that we have going on a morbid process due to the presence of microörganisms; and that the introduction of these microörganisms into a suitable nidus will certainly set up a similar process.

Contagiousness of Septicemia.—The evidence of the communicability of this disease is so voluminous that I shall not attempt even to review it, but simply refer the student to the histories of the various epidemics that have occurred; to the admirable paper on the subject by Dr. Oliver Wendell Holmes; and to the individual cases which are only too well known by a large number of practising physicians.

As to what becomes of the microörganisms in the cases which recover, or how or in what manner the contagium is eliminated from the body, we know nothing positive. Welch, in speaking of the "Modes of Infection," makes the following statements:

> The specific germs of infectious diseases can be, and in cases of recovery doubtless often are, destroyed within the body. Contrary to what many have believed, the kidneys and intestines cannot be regarded as important means of freeing the body from microörganisms that have gained access to the blood. When specific microörganisms of an infectious disease are found in the urine or in the feces, it may be inferred that the genito-urinary apparatus and the alimentary tract, respectively, are the seat of some lesion produced by these organisms.

We do not know how the microörganisms are eliminated from the affected patient or how they are introduced into the unaffected one. All that we do know is that this transfer is made.

Pathological Anatomy; Sapremia.—On post-mortem examination there are found in patients dying from puerperal sapremia only such lesions as are due to continued high temperature. Rigor mortis is usually feebly marked. The blood is imperfectly coagulated. The heart is flabby and marked with petechiæ beneath the pericardium. The liver and kidneys are congested and softened. There is always hypostatic

congestion of the lungs. The spleen is large, soft, and at times almost diffluent. The mucous membrane of the alimentary canal is soft and swollen. Microscopically the heart, liver, and kidneys are found to have undergone fatty degeneration. Welch has shown experimentally that these degenerations take place under the influence of high temperature without the addition of any toxic agent.

Pathological Anatomy; Septicemia.—In puerperal septicemia there are various conditions found post-mortem. If the patients die within the first twenty-four hours, as they do in some epidemics, there are often no gross lesions. But when the tissues of these cases are examined by the microscope, there are found cloudy, swelling, and granular infiltration of the cells, showing a beginning inflammation.

In patients living over twenty-four hours there is almost invariably a marked inflammation of some of the serous membranes. The peritoneum is the one most frequently affected; and for this reason Gooch calls the disease "peritoneal fever." There is an exudation of plastic lymph, usually not great in quantity, and a considerable amount of serous fluid is poured out. The intestines are distended with gas and stuck together; or, more rarely, the pleuræ, or the pericardium, are involved, and show the exudations of lymph and serum. Microscopically, the fluid exudations are shown to contain large quantities of chain-like micrococci. As has been stated, these micrococci are also found in the substance of the muscles, heart, kidneys, and liver.

Prognosis.—The duration of puerperal sapremia is variable. It depends upon the condition of the patient at the time the disease is recognized; upon the anatomical relations of the pelvic organs in the individual, these relations having much to do with drainage; and upon the treatment. Many cases will recover in a very few days. Others, in which there is very much difficulty in keeping the uterine cavity cleansed, remain ill for days, or even weeks. Nothing can be said as to the time; all that can be positively stated is, that under proper treatment every case will certainly recover.

Septicemia may terminate fatally within twenty-four hours. The vast majority are either dead or convalescing by the sixth

day. The percentage of mortality is very high. Some have gone so far as to say that no genuine case ever recovers. This statement is, undoubtedly, too sweeping; for almost every one who has seen these cases has seen certain ones, in which the diagnosis was beyond question correct, recover.

The death-rate in some epidemics is greater than in others, just as in measles and smallpox the virulence differs in degree with each epidemic. In septicemia, the greater the number of cases, the higher is the percentage of deaths.

Prophylaxis.—Prophylaxis means simply surgical cleanliness of the patient, attendants, and all appliances. I will not take up time reviewing various methods with which all are familiar, but give briefly the method we carry out at the Maryland Lying-in Asylum:

All the patients, when admitted, are given a full bath and clean clothes. The bath is repeated at least twice a week up to the time of confinement. After labor begins, if there is time, a full bath is given; if there is not sufficient time, a thorough sponge-bath, with a liberal quantity of soap, is used from above the umbilicus to the knees, and followed by a rinse of a 1 to 2000 corrosive sublimate solution, and a vaginal injection of a 1 to 5000 corrosive sublimate solution. A soap-and-water rectal injection is also given, and a confinement gown fresh from the iron is put on. If the labor is prolonged, the vaginal injection is repeated.

No physician who is attending a puerperal disease of any kind attends a case of labor. The hands, nails, and arms of the physician are cleansed with soap and water, and a solution of corrosive sublimate, in the ordinary way. He removes his coat, and either puts on a white apron or trusts to his bare arms and ordinary white shirt. Carbolized olive oil is used to lubricate the fingers. The number of vaginal examinations made is as few as is considered expedient, though, in an institution like this, where practical obstetrics is annually taught to a large class of students, the number of examinations is necessarily greater than in private practice.

The nurses wear dresses and aprons made of some light-colored stuff that will wash, and are as scrupulous about their personal cleanliness and other precautions as the physician.

The rooms of the hospital are large, well lighted, and well ventilated. Three times a week the floors all over the house are scrubbed with soap and water, and these are followed by a solution of corrosive sublimate.

The bed for each confinement is made up at the time. Everything about the bed is fresh and clean. Tarred paper or a rubber blanket is used to protect the mattress.

In case forceps or other instruments are necessary, they are carefully disinfected and warmed before they are used.

The labor is not considered completed until the genital tract is thoroughly emptied. It is thought safer to remove bits of placenta and shreds of membrane from the uterus with the hand than to allow them to remain. Except after operative cases, the vagina and uterus are not washed out. In all cases the external genitals are washed at once, and freely dusted with a mixture of iodoform and boracic acid.

The secundines are taken at once from the room. During the puerperal period, where there are no special indications, it is not considered advisable to use either vaginal or intra-uterine injections. All injuries to the perineum, except very slight lacerations, are repaired at once.

Treatment of Sapremia.—From the nature of sapremia, the treatment easily falls under four heads, and the only discussion is as to the best method of obtaining the objects sought, which are :

1. To cleanse the parturient canal.
2. To secure tonic uterine contractions.
3. To control temperature.
4. To support the patient.

To keep the vulva and vagina properly cleansed is quite easily accomplished by external washes and vaginal injections. The vaginal injections are ordinarily some of the standard antiseptic solutions, preferably corrosive sublimate 1 to 5000. A vaginal injection should be given preparatory to all operations upon the uterine cavity.

The cleansing of the cavity of the uterus presents more difficulties, and, consequently, more methods. On account of the comparative ease with which it can be accomplished, and on account of its efficiency, I place intra-uterine injections as the

first and most important of these methods. I prefer for an intra-uterine wash a solution of corrosive sublimate of about 1 to 5000. There have been a number of accidents from the use of corrosive sublimate in the parturient canal, but I think that nearly all, if not all, such accidents can be traced to some defect in the use of the solution. In a number of these cases the error has been in using an unnecessarily strong solution in large quantities, or sufficient precautions have not been taken to insure the exit of all the fluid injected.

The syringe best adapted to intra-uterine injections is one made on the pattern of the Davidson with the rectal nozzle on, and attached to this a soft-rubber intra-uterine tube that I had made for the purpose. This tube is about twelve inches long, and No. 17 (American) calibre. It is made of the same material as the soft-rubber catheter. The point is smooth, round, and closed. Three inches from the point is a slightly raised collar. Between the point and the collar, but grouped rather toward the point, are three large, lateral, velvet-eyed openings. The whole instrument is smooth and flexible; there is not a rough edge that can scratch the most delicate surface. The open end of the tube is slipped over the nozzle of the syringe, and both are filled with corrosive sublimate solution. The tube is introduced by grasping the point between the index and middle fingers of the right hand, allowing the remainder of the tube to rest in the palm of the hand; then carry the point up to the external os, and reflect the point into the cervical canal; grasp the middle of the instrument between the thumb and finger of the left hand, and gently push it in until the collar is felt at the external os. You then know that the point of the tube is well into the cavity of the uterus, and still at a safe distance from the fundus. The solution is then forced into the uterus until it returns quite clear. About a quart is the quantity usually used, though as much as a gallon is sometimes necessary. After the injection is finished, instead of removing the whole instrument at once, the nozzle is slipped out of the tube, and the latter is left in place to insure the exit of all the injected fluid. When the tube comes out of itself it is placed in a 1 to 2000 corrosive sublimate solution till wanted.

I prefer the soft-rubber injection tube for several reasons: it is much cheaper than the more complicated instruments; its flexibility allows it to adapt itself to whatever angle is formed by the vaginal and uterine passages; being soft and perfectly smooth, it is not apt to break up granulations, thus producing hemorrhage, and making another possible route for septic infection. The stream of water passing through the small nozzle of the syringe, then through the enlarged and even calibre of the tube, then out through several large openings, gives necessarily a gentle flow into the uterus. I do not believe it is possible to introduce a soft-rubber tube through an os that is not sufficiently dilated to insure a return flow—hence risk of distention of the uterus is avoided. When it is desired to keep up constant drainage, the same tube answers admirably. It can be made to retain its position by fastening the outer end to the thigh with a piece of adhesive plaster.

In some cases, especially where there are retained bits of placenta, the douche fails to bring them away. In such cases the dull curette should be used, but not until the douche has failed. Put the woman in Sims's position and scrape out the entire uterine cavity, and follow the curette immediately by an intra-uterine injection.

Doleris has invented a sort of brush with which he swabs out the cavity of the uterus. The indications for its use are the same as for the douche or curette.

To secure contraction of the uterus fifteen or twenty minims of fluid extract of ergot should be given every two hours. If the interval between the doses be so long as four hours, the uterus relaxes and increases the opportunity for the accumulation and absorption of the products of decomposition. The same quantity of ergot does not act with equal power upon all cases, and the dose must be varied until the quantity is found that keeps the uterus firmly contracted. The stomachs of some patients will not bear the fluid extract; in these cases the extract or ergotine may be used. Occasionally the hypodermatic syringe must be resorted to. I am in the habit of using the fluid extract subcutaneously. Put the full length of the needle into the outer and lower side of the thigh and there is no need to fear abscesses.

When the temperature is not at once controlled by cleansing the cavity of the uterus, some antipyretic may be given, preferably antipyrin or antifebrin. Antipyrin should be used in fifteen grain doses, antifebrin in about half that quantity. No antipyretic should be given at stated times in stated doses, but the temperature should be watched carefully and a sufficient amount of the antipyretic given to keep the temperature below 102.5° F.

To promote drainage the patient should be raised to a sitting posture to attend to the calls of nature. At least a part of the time she should have her shoulders and back raised to a higher level than her hips, and at the earliest possible period she should be gotten out of bed.

Nutritious and easily digested foods should be given in as large quantities as the patient can be induced to take them. Milk given regularly every two hours is probably the most reliable aliment.

Treatment of Septicemia.—There is no specific treatment for septicemia. Indeed the various plans of treatment differ widely. The value of each form has been praised highly by whoever happened to think he invented it; but the verdict of practitioners, as a whole, has not been given in favor of any definite line. And to-day the results of treatment differ as much as they did when Gooch wrote over fifty years ago:

> Richter could almost always cure it. Dr. William Hunter and Dr. Clarke could scarcely ever cure it. In Dr. Lowder's time it was observed that every woman who *was* blooded died. In Dr. Armstrong's time it was observed that every woman who was *not* blooded died.

In Gooch's earlier practice he bled freely and often. In his later practice he almost entirely discarded bleeding, and applied moist heat to the abdomen and gave, first a cathartic, usually calomel and jalap, and followed the cathartic by tincture of opium.

But it is hardly worth the while to review many of these older authors. The treatments that they used seemed to produce wonders in the hands of the individual who inaugurated them, and as a rule they failed signally when used by the general practitioner.

Alonzo Clark and many of his followers have used opium in large doses. In some cases treated at Bellevue Hospital a number of years ago, his instructions to his assistant were: "Narcotize them within an inch of their lives." The amount of opium given was gauged by the effect on the respiration. That amount was given which would keep the number of respirations down to about twelve to the minute. This plan has been used very extensively in this country, and probably with better success than any other treatment.

Fordyce Barker recommends highly the use of veratrum viride. But he says himself that

> It should not be given in those cases in which rapid prostration is manifested by a feeble, thread-like pulse, profuse sweats, and cold extremities.

If these exceptions are carefully followed, I think there will be little veratrum used.

Quinine, Warburg's tincture, salicylate of soda, resorcin, antipyrin, antifebrin, phenacetin, cold baths and cold packs have all been used to reduce temperature, and all with about equally negative results as to permanent benefit.

One of the more recent methods of treating peritonitis, including the peritonitis of puerperal septicemia, is by the use of saline cathartics, especially magnesium sulphate; all other remedies being excluded.

Intra-uterine irrigation is also used, but I cannot conceive of any possible good being done in this way. The pathogenic microörganisms and their products are both in the system beyond the reach of any possible local treatment.

The treatment that seems to promise the best results in all hands is not exactly like any of the above but more nearly resembles Gooch's later ideas. It consists of a full dose of magnesium sulphate given at once, and repeated every twenty-four or forty-eight hours; applications of moist heat over the abdomen; sufficient opium to allay pain; sufficient antipyrin or antifebrin to keep the temperature below 102.5° F. A large number of cases will not require any antipyretic; when one is used, it is best to leave it with the nurse with instructions to repeat the dose when indicated by the thermometer.

I do not think quinine of any value in these cases and have ceased to give it.

Matthews Duncan recommends for the flatulence, in extreme cases the trocar and canula, for the mild cases charcoal.

Should the peritonitis go on to suppuration, the proper procedure is to make an abdominal section, wash out the peritoneal sac, and drain it.

THE GENU-PECTORAL OR KNEE-ELBOW POSITION IN OBSTETRICS.

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The genu-pectoral position as a method of diagnosis and treatment has found more favor in modern gynecology than in obstetrics. Since the accidental discovery by Sims of the influence of gravitation in reducing a dislocated uterus, the postural method has become a well-recognized form of treatment in various diseases of the uterus. Strange to say, however, in obstetrics this particular form of posture—the knee-elbow position—is barely mentioned by modern authors, except by a few in the treatment of retroversion or retroflexion of the gravid uterus, and in prolapse of the cord. The conditions requiring the influence of posture in procuring gravitation in certain directions obtain more powerfully in obstetrics than in gynecology, and hence the opportunities for the practical application of this method should be even more obvious. It is due, however, to its use in obstetrics that the knee-elbow position (which we especially consider here) first found its applicability. It was known early in the Christian era,[1] and was recommended and practised in England and Germany in the eighteenth century (Deventer, 1701; Smellie, 1748; Mowbray, 1724; Henry Bracken, 1737; Ludwig v. Knoer, 1747; George D. Boessel, 1756). A very extensive paper was written on this subject by F. A. Ritgen in 1820.[2] This author gives not less than twelve different indications for the use of this position in obstetrics. It is singular that in spite of the great reputation

[1] According to Winckel, Soranus was acquainted with it; Ali ben Abbas and Serapion recommended it in obese persons.

[2] Die Anzeigen der mechanischen Hülfen bei Entbindungen. Giessen, 1820.

of Ritgen, German obstetricians since his day have little favored his recommendations. Among Americans, Bard and Shippen are mentioned as first having taught and practised this method.[1] To Thomas, of New York, the honor is due of having rediscovered (we may say) and insisted upon the importance of the gravitatory influence of the knee-elbow position in reducing the prolapsed cord. Quite recently Maxson, of Syracuse, New York, has strongly urged this position for turning, especially in facilitating cephalic version. It may, therefore, be justly said that as in gynecology, so also in obstetrics America deserves the honor of re-establishing an almost "lost art."

Definition.—The terms "knee-elbow" (genu-cubital) and "knee-chest" (genu-pectoral) position are regarded generally as synonymous. They are not so, however, because neither expresses exactly the position as generally understood. In the former the correct or faulty posture depends upon the position of the elbows, whether they are carried away from or toward the body; in the latter, it is almost impossible to bring the upper part of the body in the kneeling position so low down as to touch a horizontal plane with the chest.

Aveling, in his admirable monograph, *Posture in Women*, divides the kneeling posture employed in midwifery into two forms: the knee-head-ascending and the knee-head-descending. The former is believed by many obstetricians to be by far the best in which a woman can be placed during the last stage of parturition; it includes all the postures which a woman assumes when she kneels with her body more or less erect.

The knee-head-descending is commonly called the "knee-elbow" or "genu-cubital" posture, but as the knees may be placed low and the elbows high, the term does not necessarily indicate the sloping position of the body here called the knee-head-descending. Aveling also objects to the term "knee-breast" posture for two reasons: first, it does not positively indicate the intended inclination of the body; and, secondly, it is impossible for any person to adopt this position. He says:

[1] Parvin: American Practitioner, January, 1877.

Any one who will take the trouble to kneel upon the floor and maintain his femora erect will at once find that he cannot touch with his breast the horizontal plane upon which he rests.[1]

A more precise definition is, therefore, necessary to explain the proper position of the body for the uses to be hereafter described. No better description can be given it than has been done by Sims:[2]

Place the patient on a table on her knees and bend her body forward until the head is brought down to the plane of the table, where it may rest in the two hands, its weight supported on the left parietal bone, while the elbows are thrown out widely from the sides. The knees are to be separated eight or ten inches; the thighs are to be at about right angles with the table. Thus the plane of the table, the axis of the thighs and that of the body would form a right angle, and the body the hypothenuse. The patient must be taught to maintain unflinchingly this position; she must not pitch forward and make the pelvian angle obtuse, nor draw the knees under the body, making it more acute; she must not arch the spine upward, for this brings into forcible action the abdominal muscles, which should be perfectly relaxed, with the spine rather curved downward, as we see it in sway-backed animals. With these precautions fully impressed upon her, she is to breathe easily and relax the muscles of the abdomen. In consequence of this position, quietly maintained for a few moments, the movable abdominal and pelvic viscera necessarily gravitate toward the epigastrium.

It has already been said that the knee-elbow position may be used advantageously as a means of diagnosis and treatment in obstetrics; as a measure of diagnosis its applicability is very limited; as a means of treatment it is more general. It may be resorted to (1) in pregnancy, (2) during labor, either as a posture in natural labor or for certain operations, and (3) after labor, during the process of involution in certain conditions. In gynecology the main object in making a female patient assume this position is twofold: (1) to relieve hyperemia of the pelvic organs, caused by the superimposed weight of the abdominal viscera, and (2) to correct certain displacements of the uterus. If we bear in mind that the physiological congestion of the uterus and its vicinity in pregnancy will increase the tendency to hyperemia, and hence also to displacements of the uterus, we can readily conjecture that in obstetrics as well

[1] Obstetrical Journal of Great Britain and Ireland, vol. iv. (1877) p. 783.

[2] Clinical Notes on Uterine Surgery, p. 13.

as in gynecology—in the former even to a higher degree than in the latter—the employment of this method will find numerous indications.

I. Pregnancy.

(*a*) for diagnostic purposes.

As a diagnostic measure, examinations in the knee-elbow position are generally not so satisfactory as in the dorsal position. In the latter the patient is less fatigued, abdominal palpation and auscultation are more easily performed, and the cervix uteri more easily reached by the finger on account of its lower position in the vagina. Certain conditions may, however, require an examination in the knee-elbow position, to supplement, it may be, the knowledge gained by the ordinary examination of the woman on her back. Ritgen recommends it for pelvic exploration, particularly in fleshy persons, stating that

> for the accoucheur who wishes to examine the region of the osea and linea innominata it is very convenient. For investigations, with four fingers or the entire hand, it is especially applicable.[1]

McClintock also recommends it in the diagnosis of pregnancy for *ballottement;* he says:

> A better way is to place the patient in the genu-cubital position, resting her folded arms on a stool or cushion. The examiner then applies his fingers over the most prominent part of the uterus and endeavors, by a sudden upward movement, to displace the fetus and to feel its descent again on the hand. . . . The diagnostic value of this test was singularly exemplified in a case recorded by Dr. Gaillard Thomas, of New York, who by its means diagnosticated *per vaginam* a left tubal pregnancy about the fourth month; and, acting upon this diagnosis, he successfully opened the cyst from the vagina and removed the embryo and secundines. *So delicate an application of this physical sign is perhaps unequalled up to the present time.*[2]

In great obesity of the abdominal walls in fleshy persons, palpation of the uterus might be made more easily in the knee-elbow than in the dorsal position, because the weight of the

[1] Quoted by Henry F. Campbell in his paper on "Pneumatic Self-replacement in Dislocation of the Gravid and Non-gravid Uterus." Gynecological Transactions, vol. i. p. 200.

[2] Note to Smellie's Midwifery, Sydenham Society edition, vol. i. p. 191.

pregnant uterus puts the abdominal walls on the stretch and throws the womb more forward against the palpating hands.

Certain complications, as, for instance, tumors of the ovary, which may otherwise elude detection, may be palpated and isolated from the pregnant uterus in this manner. The distinction between the neoplasm and the pregnant uterus is thus made with greater facility.

(*b*) AS A MEANS OF TREATMENT.

HYPEREMIA.—In pregnancy the increased weight of the womb, even in the absence of other (pathological) complications, may give rise to certain symptoms which are all referable to pressure. In addition to the physiological congestion there may be a venous stasis. This stasis may manifest itself in the womb itself, the cellular connective tissue, or other adjacent organs. Edema of the genitalia and lower limbs, varicosities of the vulva and legs, hemorrhoids, etc., are all the result of some impediment to the return flow of the blood, and demand proper postural treatment. Ordinarily the dorsal position is advised, and properly so; but the genu-pectoral or knee-elbow position is still more rational, as it not only prevents the downward pressure, but also carries the uterus and adnexa away from the pelvis. In the albuminuria of pregnancy due to pressure of the gravid uterus on the ureters this postural treatment is of great benefit, because it carries the womb away from the spinal column.

Vesical irritation from womb pressure is often relieved by the patient assuming this position. The reason is plain: the normally anteverted uterus, which has been exerting a pressure on the fundus of the bladder, is temporarily carried upward, and thus lifted off. It also removes the pressure of the cervix on the neck of the bladder. In advanced pregnancy this symptom sometimes becomes very distressing. Some patients will instinctively assume this position to relieve pain from pressure; others are able to evacuate the bladder only in this or the ordinary kneeling posture, slightly bending forward. Constipation due to mechanical pressure of the womb against the rectum may thus be relieved. Prolapse of the rectum as well as

hemorrhoids, when there is a tendency to these affections, may thus be averted.

All of these complications become aggravated in the more advanced stages of pregnancy, hence this treatment is particularly indicated toward the end of the gestation period, at least in the second half. But, sometimes, even early in pregnancy persons suffer great discomfort from pressure. Aveling[1] says:

> In early pregnancy and uterine enlargements it is sometimes highly desirable that the uterus, in consequence of the distressing symptoms which it produces, should be made to ascend into the abdominal cavity. For these cases the knee-elbow position will be found to favor the manipulation of the operator.

Retroversion and Retroflexion of the Gravid Uterus. —In this condition postural treatment is almost a *sine qua non* to correct the backward dislocation, either with or without manual interference, according to the size of the womb and the gravity of the case. This being a pathological occurrence and endangering the continuance of pregnancy, and probably ultimately also the life of the patient, it demands prompt treatment at the hands of the obstetrician. Undoubtedly Nature often corrects the displacement without the knowledge of the patient or physician; for as the uterus normally rises out of the pelvis and becomes anteverted, a slightly retroverted or retroflexed uterus will be gradually thrown forward and become straightened out, if not held back by adhesions. Sometimes, however, the womb may become accidentally retroverted or retroflexed and held in this position, especially if pregnancy be advanced to the third or fourth month, until replaced by artificial means. It is, therefore, in these two classes of cases that backward displacement of the gravid womb is more apt to occur: 1. Previous retroflexion of the uterus, the organ being held down by posterior adhesions, but the flexion not acute enough to prevent conception and the continuance of pregnancy. 2. Accidental or acquired backward displacement of the uterus during pregnancy. In the former the dislocation is more apt to be a flexion, in the latter a version. Postural treatment alone is,

[1] Influence of Posture on Women. Obstetrical Journal of Great Britain and Ireland, vol. i. p. 623.

however, rarely sufficient of itself to correct the backward displacement of the dislocated organ. Sims[1] and Campbell[2] attach all importance to the influence of pneumatic pressure by the admission of atmospheric air into the opened vagina, an opinion, however, not agreed to by all other authorities. Berry Hart,[3] for instance, says:

> I am aware that many eminent gynecologists hold that spontaneous replacement of the retroverted uterus does occur in the genu-pectoral posture when the vagina is open to admit air. I can say, however, that I have never seen such a result in any case, nor do I believe it possible.

He contends that

> Complete replacement of the retroverted uterus can only be obtained when, in addition to the genu-pectoral posture and opening up of the vaginal orifice, pressure on the fundus through the rectum, or distending the rectum with air or water, or bringing down the uterus with a volsella toward the vaginal orifice, is employed.

Hart's explanation does not, however, invalidate the argument that posture in the knee-elbow position will greatly assist the replacement of the retroverted organ if the displacement be not beyond a certain line in the transverse axis of the pelvis. In fact, the increased weight of the pregnant uterus will facilitate the replacement if the fundus does not fall below this imaginary line. If the woman be placed in the knee-elbow position and the fundus is on the abdominal side of this transverse axis, its own weight will tend to throw the fundus upward (*i. e.*, toward the diaphragm) and forward, *provided* the cervix find room to be correspondingly tilted downward and backward.[4] If in a retroversion the fundus rests deeply in the hollow of the sacrum and the cervix is resting on the symphysis, it stands to reason that the fundus will sink still lower toward the perineal side of the pelvis. Or, if in a retroflexion the uterus is bent at the cervix and the fundus is on a lower

[1] Loc. cit. [2] Loc. cit.

[3] The Clinical Features, Anatomy, and Uses of the Genu-pectoral Position. American Journal of Obstetrics, vol. xiv. p. 822.

[4] It stands to reason that, owing to the inversion of the body in the knee-elbow posture, the relationship of the viscera to the axis of the body will be correspondingly reversed. When it is said that the uterus is thrown upward—*i. e.*, toward the diaphragm—it is in reality tilted *downward*, because the chest is in a lower plane than the pelvis.

plane than the angle of flexion, the longer arm of the uterine axis will by gravitation tend to sink still lower into the sacrum. To correct either displacement two objects must be attained: a *pushing* up of the fundus and a *pulling* down of the cervix. If traction be made on the cervix, it tends to straighten out the uterine axis or convert it from a horizontal to a vertical position. The moment the heavy fundus approaches the axis of the body of the patient the uterus will fall forward into the proper anteverted position. "To summarize, it should be a combination of push and pull" (Parvin).[1] When the uterus has become incarcerated or is held down by inflammatory adhesions, attempts at reposition may prove very difficult or even futile. We should, however, not despair of eventual success if we persist in our efforts. It may take weeks to accomplish this object, but the seemingly most difficult cases may finally prove successful. Lusk[2] says in his own practice he has invariably been successful in correcting a retroflexion of the gravid uterus in the knee-elbow position. Other authors relate similar experiences, although it cannot be denied that sometimes the induction of abortion is the only alternative between a continuance of pregnancy in a displaced uterus and the correction of the difficulty.

Vomiting of Pregnancy.—As this is a symptom of varying conditions of pregnancy, no one treatment will prove of avail in all cases. Pressure of the pelvic organs may provoke it; according to Graily Hewitt, a flexion is the most common cause of this reflex symptom. Without subscribing to so extreme a view, it is certain that in some instances vomiting and nausea are caused by some change of position in the uterus. To relieve the hyperemia or correct the displacement, the genu-pectoral position may be tried if other remedies fail. If a backward displacement is diagnosticated *per vaginam*, postural treatment should unhesitatingly be tried. I have also found the knee-elbow position of assistance in emptying the stomach if it contained indigestible or undigested material. If nausea is persistent, relief is only obtained after evacuation of the contents of the stomach. An illustration of the rationale of this treatment is given in the following case:

[1] Science and Art of Obstetrics. [2] Ibid.

A young married woman in her third pregnancy endeavored to produce abortion in the second month. In this she was unsuccessful, but nausea and vomiting set in soon after, which became uncontrollable. After various medicinal agents had been tried without avail, she was admitted in March, 1889, to St. Mary's Hospital of this city, in a thoroughly emaciated condition, vomiting being incessant. An examination *per vaginam* revealed a pelvic peritonitis and an acutely retroflexed uterus in the third month of pregnancy. Efforts were made at reduction, first in Sims's position, but had to be discontinued on account of the great pain caused by pressure on the fundus. The uterus appeared bound down by fresh adhesions posteriorly. The patient was put in the knee-elbow posture, and pressure was made upon the fundus through the vagina by means of the finger. Not much was gained; however, the fornix vagina was dusted with iodoform and a cylindrical cotton tampon placed transversely behind the uterus, after which, the finger remaining against the tampon, the patient was slowly replaced into the lateral prone position and enjoined to retain this position in bed. These attempts at reduction of the womb were cautiously made every day or two, placing the patient each time in the knee-elbow position and inserting a tampon at the end of each manipulation. Owing to the pelvic inflammation and the effusion, it was not thought advisable to use much force. Gradually, however, the uterus yielded more and more until, finally, at the end of about two weeks, it was entirely replaced into its normal position. The vomiting had ceased a few days after the first attempt at reduction. Some obscurity surrounded the diagnosis of pregnancy, as the amount of the effusion, the size of the uterus, and the pain on pressure were so great as to prevent much manipulation. One of the gentlemen who assisted me denied the existence of pregnancy. The subsequent history, however, confirmed the original diagnosis. The patient left the institution soon after in good health, but miscarried in June, the fifth month of pregnancy.

In this case the good effect of postural treatment is shown on the vomiting in the first few days, even before the uterus was reduced, being only supported. The pelvic effusion complicated the treatment, but the insufflation of iodoform and support of the uterus by the tampon certainly also had a favorable action on the inflammatory process. The patient expressed herself at once relieved of the most distressing symptoms—vomiting and pain.

II. Parturition.

Normal Labor.—Among civilized races the knee-elbow position is rarely resorted to by women in ordinary labor; and yet it cannot be denied that if they were left to the instinct of

nature alone they would probably assume this position more frequently than they do at the present day. It must be understood, however, that this knee-elbow position instinctively assumed is not the genu-pectoral, for the chest is usually *not* supported, but the patient rests on her knees and elbows alone. Among some of the Asiatic tribes and North American Indians[1] this posture is adopted by all women in labor. It seems as if the kneeling position was also common in Greece in ancient times, for Lethe is described by Homer as giving birth to Apollo in this position ; and even at the present day some of the women in Greece are delivered in this manner. According to Ploss,[2] many English women in Smellie's and Spence's times were delivered from behind in the knee-elbow position. According to McClintock,[3] the prone posture (knee-elbow) has been employed at no very distant period in parts of Cornwall, the north of Scotland, and in remote parts of Ireland. Denman was of opinion that resting on the hands and knees is the position instinctively sought for, and perhaps most natural in the time of labor. According to Mauriceau and Baudelocque, some of the French women were delivered in this manner. McClintock, commenting upon these historical notes, says:

> In the course of labor, I have often found it serviceable to put the patient into the genu-cubital position for a little time. The change of posture was a relief to her, and where the axis of the uterus seemed to lie too near the spine (as in some primiparæ) its rectification was favored by the position in question.

Indeed, the frequency with which women, who thought themselves unobserved, exchanged the conventional dorsal or lateral position for the squatting or kneeling posture has induced some medical ethnologists (Engelmann, Hennig, Campbell) to make a strong plea for allowing parturient women greater liberty in assuming their most comfortable position. The kneeling posture often renders the use of the forceps unnecessary, and, according to Campbell, protects the perineum most efficiently. Hennig relates an instance[4] where a partu-

[1] Ploss and Engelmann.

[2] Lage und Stellung bei der Geburt.

[3] Loc. cit., vol. i. p. 204.

[4] Note to translation of Engelmann's work on Labor among Primitive Peoples.

rient woman in Leipzig, who had given birth to seven children previously with difficulty, in her eighth labor, being without assistance, knelt down upon the ground and was delivered of a large-headed child, breech presentation, in a few minutes. The kneeling posture is, however, a useful expedient only in the second or expulsive stage of labor. In the first stage, pressure of the presenting part of the child upon the cervix is desirable for the purpose of inciting labor pains. Hence the woman is to assume the erect or semi-erect position. If the head be carried away from the cervix, as in the knee-elbow, or, still more so, in the so-called knee-chest position (the face resting on a horizontal plane), labor pains will be retarded or momentarily suspended. However, as this retardation or suspension may be desirable in certain instances, advantage may occasionally be taken of this occurrence. If, for instance, the pains are excessive whilst the os is hard and unyielding, a woman may be put temporarily in this position; or, if in a malposition preparations are being made for artificial delivery or additional aid is being summoned, the pains may be thus temporarily suspended. If, again, for some reason or another, it is desirable to maintain the bag of waters as long as possible and to prevent its too early rupture, the knee-elbow position is a valuable expedient. It might also be tried early in labor in those cases in which women habitually have had malpresentations. Here the object is to assist the rotation of the body of the child until it enters the brim of the pelvis by one of its polar extremities.

In all these instances the desired object may be attained by gravity alone. But a still more urgent indication for the adoption of this position is in those instances where it facilitates certain operative measures. These shall be next considered.

Forceps.—Ritgen[1] says:

> With a pendulous abdomen we can very early apply the forceps from behind, even when the head rests upon the ossa innominata and does not properly enter the pelvis. The last movements in passing the perineum can very well be made in the same position.

[1] Campbell, loc. cit.

McClintock[1] states that in his early professional life he knew an old accoucheur who always put the patient in the knee-elbow position when using the forceps. He says:

> He was a good practitioner, and acquired his experience in a remote part of the north of Ireland, where it was customary among the peasantry to deliver *every woman in this position.*

In preternatural and instrumental deliveries Fielding Ould also directed the patient to be put on the hands and knees.

With all this, we do not think, however, that in ordinary forceps deliveries the knee-elbow position possesses any advantage over the dorsal or lateral position. It is true that the perineum will be less likely to become lacerated than in the dorsal position, but if this be feared the lateral position can be assumed. A further disadvantage of the knee-elbow position is the inability to administer anesthetics properly, and these should always be given in difficult cases, both to prevent pain and secure relaxation of the soft parts. Furthermore, as the convexity of the blades of the forceps corresponds to the concavity of the sacrum, it is always more convenient to introduce them from above downward—that is, when the pelvis is in the horizontal position, the patient lying on her back. These objections, therefore, counterbalance any advantage to be derived from the knee-elbow position. One possible exception to this, however, might be made in those cases where the occiput is posterior and the blades are introduced in such a way that the cephalic curve passes over the ears of the child, the tips resting on the occiput. This is done by applying the forceps reversed—that is, with the convexity of the pelvic curve toward the pubes instead of in the hollow of the sacrum as usual. This method, suggested by Dr. William L. Richardson, of Boston,[2] for the rectification of occipito-posterior positions, might be more easily carried out with the patient in the knee-elbow position, as it gives more room to the handles in the introduction of the blades from above downward. In addition to this, the force of gravity might also favor anterior rotation of the occiput.

[1] Loc. cit.

[2] Medical Communications of the Boston Medical Society, vol. xiii., No. 4, 1885, p. 412.

Version.—When we contemplate the difficulties often surrounding this operation, the knee-elbow position is of great advantage, and it is to be regretted that the profession is not better informed as to its advantages. Version is resorted to either to correct a malposition of the fetal parts, or to terminate labor speedily on account of hemorrhage or some other urgent cause. In both instances one presenting part of the child must be changed for another. Now, if we bear in mind that the presenting part is forced down upon the inlet of the pelvis, if not already in the cavity, by the contractions of the womb, we can readily understand that the force of gravity will render this operation still more difficult by adding the weight-pressure to the contractions. The knee-elbow position will relieve both: 1. By gravity acting in the contrary direction (toward the diaphragm) the child will be carried away from the pelvis, giving more room for operative manipulations with the hand. 2. Labor pains are temporarily suspended, and hence contractions of the uterus prevented. To this may be added a third very important reason, already previously mentioned, that the knee-elbow position in itself tends to rectify a malposition. The obstetricians of a century ago were better acquainted with these advantages than the authorities of to-day. Smellie succeeded in bringing down the feet in this position when he found it impossible to do so in any other way. Ritgen always turned with the patient in the knee-elbow position. Of more recent authors scarcely any speak of the advantages of this posture in version; Fehling (the writer on Operative Obstetrics in the recent *Handbuch d. Geburtshülfe*, edited by Müller), however, claims for it an advantage in performing version when the fetus is in a dorso-posterior position.

The chief renewed impetus to the knee-elbow position in transverse positions was given by R. F. Maxson,[1] of Syracuse, N. Y., who showed that by the help of this position *cephalic* version may be performed. Dr. Maxson accidentally made the discovery, whilst endeavoring to replace a prolapsed funis in a transverse presentation, that the cephalic extremity, when

[1] American Practitioner, 1877.

lying nearer the os than the podalic, could be made to enter the cervix after the shoulder had been carried away from it by gravitation. After he had succeeded in replacing the cord he was surprised to find that he had secured another object: the transverse had been converted into a cephalic presentation. Subsequently he applied the knowledge thus gained to a case of transverse presentation and was equally successful. Since then other authors have reported similar cases. Linton,[1] in a right shoulder anterior position, by this method caused the shoulder to recede and the head present. In a second case of left shoulder presentation complicated with placenta previa, he safely delivered the woman by podalic version after having placed her in the knee-elbow position. Sometimes, indeed, although cephalic version was aimed at, the head failed to enter the pelvis, and the podalic extremity was substituted by nature, with an equally successful termination. Thus, Parvin[2] reports a case of left shoulder presentation in which posture gradually converted this presentation into that of the breech. Hildreth,[3] of Zanesville, reports a remarkable case of shoulder presentation, which occurred four times in the same patient. In the first two labors the arm had to be amputated (the child being dead) before version could be performed; in the last two instances the woman was put each time in the genu-pectoral position and podalic version successfully performed with the child living. Hildreth claims for this position the following advantages: 1. Gravity relieves impaction; 2, it relieves the bearing down by the voluntary muscles (suspends abdominal pressure); 3, it takes off the weight of the abdominal viscera; 4, it retains the liquor amnii; 5, it relaxes the abdominal muscles and uterus. Hildreth's paper antedates Maxson's by ten years, but nevertheless to the latter is due the credit of having shown that transverse presentations may be converted into cephalic presentations by the influence of posture alone. When this does not succeed it nevertheless facilitates operative manipulations. Cutts,[4] of Washington, has collected

[1] Ibid.
[2] Ibid.
[3] American Journal of the Medical Sciences, April, 1866.
[4] American Journal of Obstetrics, 1887.

seventeen cases by different authors, including those just mentioned, in which version was facilitated by this means. The correcting influence of the knee-elbow position is well illustrated in the following case of my own:

Mrs. T. had been delivered three times with some difficulty, owing to a moderately contracted pelvis. In her fourth labor, which was very much protracted, I was summoned by the midwife in attendance. I found the os dilated and the bag of waters broken, but the head was above the brim of the pelvis and deflected to one side, the left cheek presenting. Labor pains were very active, but each pain seemed to increase the difficulty. Anticipating trouble I sent for assistance, but meanwhile placed the patient in the knee-elbow position. This had the desired effect of suspending the downward pressure. The patient was then gradually again placed in the dorsal position, when it was found that the face had entered the brim with the chin anterior. The forceps was applied and the woman safely delivered of a living child.

Somebody has suggested the genu-pectoral position for the purpose of converting face into vertex presentations. Whether or not this has been done successfully I do not know; at any rate it did not take place in the case reported, nor was this object sought.

One objection may be urged against the knee-elbow posture in operative obstetrics, viz., that an anesthetic cannot be given. It is true that it cannot be given with the same facility as in the dorsal position, but, if need be, it may be administered to the patient while in the lateral semi-prone position, and when anesthesia is complete she may be lifted by assistants into the desired position. As a rule, however, anesthesia is not necessary, because the knee-elbow position also relieves the pain otherwise caused by downward pressure, and the patient will bear manipulations better in this than in any other position. One precaution must, however, be added. Owing to the thinning of the cervix caused by impaction in transverse presentations, great care must be exercised lest the descent of the uterus into the abdominal cavity cause a dragging of the body upon the cervix and increase the thinning, already dangerous. The fundus must, therefore, be well supported externally by the hands of an assistant, or some solid object should be placed under the abdomen upon the table or bed.

Dorsal or Nuchal Displacement of the Arms.—This complication of version or pelvic presentation, due to untimely or improper efforts at extraction, may give a great deal of trouble when attempts at replacement are made with the patient in the dorsal position. The weight of the child, as far as it is born, drags the body downward, whilst the uterine force from above drives the head more into the cavity of the pelvis, increasing the impaction. The evolution of the arms often, therefore, becomes a Sisyphus task. Both of these difficulties in the way of correcting this displacement may be met by putting the woman in the knee-elbow position. The body of the child is lifted up so that it points vertically to the outlet of the pelvis, the abdomen or back of the child meanwhile resting upon the arm of the operator. Its weight will thereby cause the head to fall farther within the pelvic cavity; the body may be consequently pushed up (down) more easily and more room gained for the introduction of the operator's hand just as in version. Should Barnes's method of rotating the child into the original position be employed, the knee-elbow position will permit its accomplishment with greater facility. An important and necessary help to all these manœuvres is the suspension of the uterine force, the securance of which should be the primary object in all cases where the obstacles to delivery are increased by the downward pressure of the contracting uterus.

Prolapse of the Cord.—Of all the indications for postural treatment in obstetrics, that for prolapse of the cord is most universally recognized. Almost all of the recent obstetric writers at least mention its efficacy in certain cases, either with or without manual assistance. The antiquity of this expedient is probably greater than for any other purpose; all of the authors cited in the beginning of this paper mention it. It is singular, however, that Ritgen—of whom Campbell[1] says:

> There is scarcely any circumstance or condition of the patient, but principally those of parturition, in which this thoughtful and circumspect teacher does not give us valuable instructions, by which we may advantageously

[1] Loc. cit., p. 199.

bring into requisition the powerful instrumentality of the *womb's inverted weight*, mostly in the gravid condition, for the removal of embarrassment, so often incident to downward pressure of the pelvic viscera—

I say, it is singular that he should forget, in his enumeration of the various indications, prolapse of the cord; but in his *Lehrbuch der Geburtshülfe*, published ten years later, he says:

When the funis presents, the midwife should instantly send for the accoucheur; meanwhile she should herself place the woman, if strong enough, upon the knees and elbows, and attempt the replacement of the cord; if the woman is too weak to admit of this, she should be placed upon the side with elevated pelvis.[1]

This latter position is in reality the latero-prone or Sims's position, which shows that this author recognized this position as the best substitute for the knee-elbow position. However, already Deventer stated "if the woman be too weak for the knee-elbow position she should be placed upon the side with one limb drawn up under the body." Verily "there is nothing new under the sun." K. F. J. Birnbaum,[2] a pupil of Ritgen, who wrote upon this subject in 1867, adopts the suggestion of his teacher, but limits the efficacy of postural treatment to that stage of prolapse of the cord when the loop is still high in the cervical canal and the cervix scarcely admits the examining finger; when it has once passed through the os uteri it would be vain to expect any good from this position. He remembers no case where manual aid was not also necessary, in addition to the knee-elbow or side position, to replace the cord or extract the child. This seems also to have been the experience of most other accoucheurs, who accept the same limitation as to the postural treatment. Of recent writers, Gaillard Thomas has again brought forward this method and induced obstetricians to give it a trial before resorting to forced delivery. Where there is no necessity for immediate action in delivery, and prolapse of the cord is the only complication, postural treatment may be tried alone; but it stands to reason that where there are other complications,

[1] Quoted by Lusk.

[2] American Journal of the Medical Sciences, April, 1868.

as a contracted pelvis, a transverse presentation, or danger arises to the life of the child from other causes, no time should be lost in making vain attempts at reduction of the cord, but delivery effected as rapidly as possible. The knee-chest posture, moreover, is of value as an auxiliary, even in those cases complicating prolapse of the cord, for the reasons already given, as in version. Cases have been reported where such complications were thus met successfully both to mother and child. Dr. Hadden, of New York, reported a case in the *New York Medical Record*, 1866, where the cord and arm were prolapsed; the patient was placed on elbows and knees, the funis reduced and then a successful version accomplished without much difficulty.

Locked Twins.—This fortunately rare but dangerous occurrence deserves the trial of any simple expedient before resorting to the dire operation of embryotomy. The unlocking of the twins is frequently a matter of great difficulty, and necessitates an accurate knowledge of the complicated position of the presenting parts. Opinions differ as to the proper method of extracting one or other of the twins in impaction, but all are agreed that we should endeavor to separate the presenting part of one child from that of the other before making traction on either child. This can be often successfully done. Pleissman, quoted by Cazeaux and Parvin,[1] succeeded by raising the lower extremities and hips of the patient high above the shoulders, with the patient on her back. The principle was the same as that sought in the knee-elbow position, gravitation downward toward the diaphragm, but the execution is not so simple and convenient as in the latter. Galbraith,[2] of Seymour, Indiana, thus succeeded in unlocking a pair of twins, when it was impossible to push the head of the second child away with the woman in the dorsal position. One of the children was already born, except the head, upon his arrival, but the life of the first child was extinct. The second child was delivered alive by the forceps, after the heads had been unlocked with ease with the woman in the knee-elbow

[1] Science and Art of Obsterics, p. 463.

[2] American Practitioner, 1880, and American Journal of Obstetrics, 1882.

position. Galbraith claims that up to the time of the publication of his case obstetric literature contained no record of the knee-elbow position having been employed to dislodge locked twins. The success in his case and simplicity of the method certainly justify early resort to it when meeting with this anomaly. It is especially of value as it in no way interferes with other manipulations, should it not prove at once successful; on the contrary, it facilitates further operative measures, such as turning or the application of the forceps.

Inversion of the Womb.—In the ordinary dorsal position the reduction of the inverted womb is rendered more difficult by the downward weight of the organ itself. In the knee-elbow posture the weight-pressure is in the proper direction—that is, into the pelvic cavity. If then the womb has been lifted up and an indentation made into its most dependent portion—the fundus, and the cervix is being dilated, the weight of the organ will assist the artificial pressure made by the operator in reinverting the womb. Hence the knee-elbow posture will facilitate this operation, especially when reduction has already begun. It should be maintained also for some time after reduction has been completed, for the purpose of preventing a repetition of the accident, which is apt to recur owing to the relaxed condition of the uterine supports.

The same holds good for prolapse of the womb accompanying delivery.

III. Puerperal Period.

During the stage of involution of the female sexual organs the indication for any other posture than the dorsal or lateral will be rare. Rest is the main agent in preventing any arrest in nature's process of restoring the parts involved in the act of parturition to their normal non-pregnant condition.

The genu-pectoral position, as it would rather retard than hasten this process of involution, will therefore be rarely called for. However, there may be some instances where a judicious and occasional use of this posture will be indicated; where, for instance, there has been retroversion or retroflexion of the womb prior to conception or labor, either as a

constitutional fault or the result of previous subinvolution. In those cases in which there is a tendency to prolapse it may also be resorted to. Finally, in inversion of the uterus which has been recently reduced, the knee-elbow posture will be an additional safeguard against a recurrence of this accident, as also against subsequent prolapse of the uterus.

In conclusion, it may be stated that in the foregoing pages an endeavor has been to point out some of the indications for the use of the knee-chest position in obstetrics. It is plain that other complications, as hernia of the bowel, prolapse of the uterus, etc., may all be treated by the same method, whether in the pregnant or non-pregnant condition. The only objection that can be urged against it is that the patient cannot maintain this position for a long time. In the majority of instances this is not necessary, and if success should not crown the first effort, resort may be had to it repeatedly without any detriment. That anesthetics cannot be easily administered in this position is no valid objection, for this is not necessary except in severe operations, and as pain is often relieved by the position itself, the main indication for anesthesia is removed. It should, however, be our endeavor always to retain whatever may be gained, if the gain be ever so little, by carefully posturing the patient in the interval between the attempts at reduction or correction. Since the latero-prone position is the next best substitute, the patient should be carefully turned over to her side and her knees gradually turned up toward the abdomen, and she should be told to remain in this position. On no account should the dorsal position be resumed until the object for which the prone posture was adopted has been attained, or when, for operative purposes, it becomes necessary to complete delivery in this position.

DISCUSSION ON CRANIOTOMY.

I. Is Craniotomy Justifiable on Living Children?

By GEORGE H. ROHÉ, M.D.,
BALTIMORE.

The question, "Is craniotomy justifiable upon the living child?" is one of the most important presented to the obstetrician. It involves the decision of the question whether we have, under any of the circumstances of practice, a right to destroy a human life.

With the legal or theological aspects of the question I will not concern myself, although I believe that neither jurist nor theologian will assume to decide contrary to the opinion of the experienced and conscientious obstetrician.

I do not hesitate to answer the question in the affirmative. In doing so I may, however, be permitted to state my reasons for so answering, and to point out the circumstances and conditions under which, in my opinion, craniotomy *is* justifiable upon the living child.

Statistics, which are so often quoted as conclusive in determining the proper line of action in this as in other surgical problems, may usually be made to support the most diverse claims. Without wishing to brand all statistics as false or valueless, I must confess that in this particular field they are more likely to lead to false than to true conclusions. If, for example, we compare the older mortality records of craniotomy (fatal in more than 20 per cent. of the mothers) with the most recent records of the improved Cesarean section in Germany (fatal to 10.6 per cent. of the mothers operated upon), or even take the record of a single operator, as Zweifel, who has done eleven Cesarean sections without loss of a single mother

or child, we shall be compelled to reject craniotomy in all cases and banish it from the list of obstetric operations. But if, on the contrary, we compare the recent records of craniotomy (mortality of mothers about 5 per cent) with the latest statistics of the modified Cesarean operation in the United States (maternal mortality 78 per cent.), we are forced to the conclusion that the destructive operation is the more conservative one. Neither of these methods of comparison is fair, however, and conclusions drawn from such statistics are false and untrustworthy.

Most obstetricians of experience are unwilling to displace craniotomy entirely by the Cesarean section—the *only* operation that can enter into consideration in most of the cases where the first-named operation is applicable.

If the obstetrician were always consulted in time, so that he could give the case, in all its bearings, careful consideration before labor begins, he would doubtless often decide upon a different course of action from that which he is subsequently forced to adopt. In practice, the consulting obstetrician is rarely called until something has occurred to obstruct the natural progress of labor, and then he is forced to do that which his judgment approves as best for his patient and her domestic relations. To be compelled to decide promptly, as often happens, between the destruction of a living child by craniotomy, or the performance of what is still rightly looked upon as the superlative operation in surgery, is not an alternative to be lightly considered.

The *circumstances* surrounding each case—as the dictionary has it, "the matters attending an action that modify it for better or worse"—must be taken into account before coming to a decision. The condition of the patient, the duration of labor, character of previous labors, degree of obstruction which the operation is intended to relieve, the prospective viability of the child—all these circumstances, and more, demand careful consideration before the character of the operation is decided upon. If the patient is worn out by the length or severity of her travail; if fever or other signs of septic absorption are present; if she has previously given birth to living children; or if the physical signs point to an early death of the fetus even if promptly delivered, Cesarean section is not an operation of election, and craniotomy is the only procedure rationally indicated. Of course, I assume that no physician with any

obstetrical experience would proceed to craniotomy without first trying to effect delivery with the forceps. With this instrument delivery can often be effected in cases where the pelvic canal is much narrower than that generally considered necessary for the passage of an unmutilated child. The cases where podalic version can achieve delivery after the forceps properly used have failed, are, in my opinion, too few to justify resort to a procedure which greatly increases the danger to both mother and child, and unduly complicates, if not successful, the perforation that afterward becomes necessary.

It is impossible to lay down hard-and-fast rules to guide us in an operation where the individual judgment must make the decision; but in a general way it may be stated that a pelvic contraction antero-posteriorly to three and a quarter inches will render the use of the forceps or version futile. Between that measurement and a conjugate of two and a half inches, craniotomy is indicated so soon as a fair trial, by an experienced practitioner with an appropriate forceps, has shown that the child cannot be delivered through the natural passages without mutilation. This condition of things I may be permitted to call the *absolute indication* for craniotomy. When carefully performed under these conditions the maternal mortality is not over 5 per cent., and under antiseptic precautions should be no greater than after delivery with forceps.

When the contraction of the pelvis antero-posteriorly is down to two and a half inches or below, the maternal danger from craniotomy is almost or quite as great as from Cesarean section. In cases presenting these higher degrees of contraction, craniotomy is not justifiable even though the child should be dead. It is only in cases near the border-line, where there is a good deal of space laterally, the child dead, and the mother exhausted and suffering from septic absorption, that perforation of the skull and evisceration may be attempted. Here the Cesarean operation is indicated and should be promptly performed.

Whether sins of commission or of omission are of greater gravity I will not venture to decide. For myself, however, I am willing to assume the responsibility of destroying the life of the child to save that of the mother under the conditions I have endeavored to point out. The practitioner who declines to perforate the cranium of a living child, and fears to resort to Cesarean section, may com-

promise with his conscience by waiting until the child is dead and then deliver by craniotomy. Him I do not envy. The obstetrician who resorts to craniotomy before the child is dead, may be, as I fear it is becoming fashionable to call him, a criminal; but the one who waits for the child to die and then loses both mother and offspring is worse—he is a blunderer!

I may also refer to cases in which the disproportion between the head of the child and the maternal pelvis is not due to contraction of the latter, but to excessive size of the former. In cases of hydrocephalus, for example, sacrificing the life of the child merely anticipates the ultimate result. Craniotomy is, therefore, indicated in these cases as soon as the diagnosis is made, for it is well known that the maternal mortality is high in labors with hydrocephalic children.

Notwithstanding the increasing sentiment in the profession against craniotomy upon living children, I believe it to be unwise to give up this operation until an efficient alternative is proposed, which gives a better promise of life to the mother than any with which we are at present acquainted.

The operation is one of the simplest in obstetric surgery. After evacuation of the bladder and rectum, the vagina is washed out with an antiseptic douche, and the obstetrician's hands and instruments thoroughly disinfected.

An assistant fixes the head by pressing the child well down into the pelvis from above, and the trephine perforator, guarded and steadied by the left hand in the vagina, is applied to the most projecting bone—usually one of the parietals. With the right hand the tube is withdrawn from the end of the trephine and several complete turns given to the handle of the latter. As soon as the scalp is cut through, the handle may be turned backward and forward as in the ordinary operation of trephining. In a few moments the skull will be perforated and the button of bone removed as the trephine is withdrawn. The brain is then broken up with any convenient instrument—a large steel sound, for example,—and the delivery left to nature, or hastened with Meigs's craniotomy forceps. The cranioclast is a cumbersome and unnecessary instrument. Where it is necessary to break up the skull with the forceps, the left hand should be kept in the vagina to guard the latter against laceration as the bones are removed.

After delivery of the placenta an intra-uterine injection may be given if considered necessary, but the antiseptic vaginal douche should never be omitted.

In destroying the brain, care should be taken to penetrate the medulla, otherwise the obstetrician may be confronted with the horrifying spectacle of a living brainless child which he has first mutilated and then brought into the world. The after-treatment presents nothing peculiar.

II. Its Alternatives.

Abortion.

By WILLIAM WARREN POTTER, M.D.,
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In considering the subject which has been assigned me in this discussion, it may not be out of place to indicate my position on the main question. While I believe, in the present knowledge of obstetrics, craniotomy has very little place, yet it is carrying the matter to an extreme to say that it should never be employed. There must come to everyone who practises the obstetric art a time when he must choose from one of several resources to be employed in an emergency. Craniotomy would be, in my opinion, entirely justifiable when the fetus is hydrocephalic or otherwise deformed, in the case of monsters, and in cases where the mother has become too exhausted to warrant the employment of abdominal section.

Coming now to abortion as an alternative resort for craniotomy, I may begin by remarking that it has necessarily a very limited application in the present light of the accoucheur's art. It may be assumed that it is only probably justifiable—(*a*) When, owing to previous difficult deliveries, in which the child was lost and the mother's life endangered, there is necessity of preventing such complications; (*b*) where there is no chance for any of the other alternatives; and (*c*) where the degree of pelvic contraction is so great that premature labor will give little or no expectation for the child's life, and future abdominal section will not be consented to. The dangers of abortion, unless carefully performed under the strictest antiseptic precautions, are almost as great, if, indeed, not equally so, as the more serious surgical interferences. Thus, it may happen that an operation, which is done to obviate the necessity of a capital procedure, will possibly finally eventuate in the performance of such operation. If pregnancy occur in a case where the condition of the woman is such that it is not possible to remove any

obstacle to completed gestation, and her state is, in other respects, such that the progress of pregnancy will endanger her life, of course, there remains nothing to be done save to induce abortion. We may justly affirm that there is nothing left for such cases as these, in the great majority of instances, only an excuse for the induction of abortion.

Having determined to make the operation, it remains for us to consider the best means to employ: 1. It should never be invoked without competent counsel. 2. Antisepsis is first and last to be strenuously insisted upon 3. The vagina must be clean, and the instruments must likewise be scrupulously clean. In general, I have very little use for a uterine sound; but here lies its appropriate field, and, probably, our best means for the production of early abortion abides in the judicious employment of this otherwise generally useless instrument. Its flexibility commends itself to the operator, for it can be shaped so as to take the uterine curves without doing violence to the structures. Introduced carefully until the fundus uteri is reached, it may be delicately turned or entirely rotated with all gentleness, and the woman meanwhile kept absolutely at rest. Antiseptic douches are to be insisted upon, and when the embryo is discharged it must be carefully examined to determine whether or not it is entire. If not, the uterus is to be curetted.

Premature Labor.

By JOSEPH HOFFMAN, M.D.,
PHILADELPHIA.

The value of induced premature labor as an alternative to craniotomy in otherwise impossible labor, is significant in that it can only indirectly, in cases in which it is applicable, militate against the life-chance of either mother or offspring. So far, then, as a life-saving procedure, it takes precedence of all other methods of either minor or major obstetries. When we say that it can only indirectly endanger the life of either mother or child, the explanation is almost gratuitous that sepsis, by criminal carelessness, may be the mother's risk, while any one of the common accidents of labor may afford a greater risk than ordinary to the child, because of its diminished viability,—the earlier the labor is induced the greater being the risk.

If we consider briefly the history of this now universally commended procedure, we shall find it at first by some barely given a place in legitimacy, tardily accepted in Germany, and violently opposed in France. Tyler Smith early urged it as one of the expedients by which the then frightfully abused operation of craniotomy might be abolished in England. Opposition to it in France was, I believe, frequently due to religious scruples of the gnat-straining, camel-swallowing variety, such as are now frequently bivouacked round the prurient desire to perform Cesarean section. The operation *per se* is not to be considered dangerous, and is to be looked upon not only as an alternative of craniotomy, but as an escape from the graver operations of Cesarean section, the Porro- and gastro-elytrotomy.

Whatever successes these may record, they neither individually nor in the aggregate can fall within the province of the general obstetrician. They are operations of technique, and success in their performance must depend on personal adaptiveness and special training. Here it is evident the simpler technique of the premature

induction of labor must afford a greater scope for the average obstetrician.

A word here as to the value of statistics in deciding the merit of this operation as a life-saving, danger-avoiding procedure. Statistics of any kind to be valuable must be homogeneous; simply lumping incongruous cases where neither maternal nor fetal conditions bear any similarity whatever, can teach nothing. Not only must the degree of pelvic deformity be duly considered, but also the lines of deformity. In this connection the investigations of Litzmann and Spiegelberg are especially valuable, as are those of Dohrn.[1] The indications for the operation may have relation either to the mother, the child, or both.

In general terms, we resort to it when it is ascertained that at full term there will exist a marked disproportion between the fetal head and the maternal pelvic diameters, or when obstructions, either pelvic or uterine, are of such a nature as to be practically insurmountable at full term. An indication, not to be considered here, is the induction of labor prematurely on account of poor health in the mother.

When the head of the child is found to be habitually large or supercrossified, an indication for the operation looking to the best interests of both mother and child is supplied.

Puncture of the membranes, while certain to bring on labor, is often slow, and has the disadvantage that when uterine contractions set in they are expended directly upon the fetus, thereby diminishing its viability, already found to be lower than the average. *The administration of oxytocics* also presents the same disadvantages.

Abdominal friction, irritation of the mammæ, and *galvanism* are not uniform in their results, and are likely to impress the patient unfavorably and frequently disappoint the obstetrician.

The application of alternately hot and cold douches is slow in its results, the average time elapsing before labor sets in being four days. Where time is urgent it is evidently useless. *The injection of carbonic acid gas*, like the injection of fluids into the uterus, should be condemned.

The trouble with inducing premature labor is, that the discovery of the condition that necessitates it is made when it is too late, so

[1] The statistics of these authors are also given, *in extenso*, by Prof. Lusk in his excellent book, pp. 496, 497.

that premature labor cannot be advantageously induced. In considering the relative indications, in the first place, the age of the child is to be considered. If we cannot bring labor on previous to six and one-half months—the object being to save the life of the child—it is not worth trying. That is the limit of time. After this the period of induction must be fixed according to the measurements of the pelvis. Those tables are a matter of statistics. The tables of Kiwisch—in which a time-value is recorded for the varying relations of the fetal head with the pelvic diameters—afford excellent data upon which to act. So far as the relative indication for inducing premature labor is concerned, it must relate to two things, the age of the child and the size of the pelvis. Then comes the consideration of the methods. Many have been tried. What we want is to use a method not dangerous to the child or to the mother. The most serious objection is to be made to any and all attempts that would inject fluids into the uterus. Such practice is most reprehensible. Under no circumstances, I take it, is it allowable. *The introduction of Barnes's dilators* is another method. The dilator to be used is of different sizes, and necessitates a great deal of manual interference and is not always satisfactory.

The two things usually recommended are the introduction of either a hard or a soft bougie. The hard metal bougie is objectionable, because if biehloride is used the instrument becomes corroded. In addition to this, with the woman lying on her back, the instrument is apt to make painful pressure. Again, the hard instrument tends, by its own weight, to gravitate out of the uterus. The ordinary bougie is usually too short. The introduction of the bougie in the body of the uterus should not be less than seven inches. The further it can be gotten up into the uterus the more certainly labor will be brought on. Another objection to the hard bougie is that the membranes are apt to be ruptured. Since the operation is for the benefit of the child this is to be considered. So, then, we come at last to the use of rubber bougies. Introduced carefully, with the wire director which is usually found in them, it can be brought safely to the uterine fundus and there left, usually bringing on labor within a few hours. If required, a second bougie may be introduced.

If necessary, the vagina can be packed, and the packing itself

will tend to bring on uterine contraction. The whole operation is brought down to a very simple procedure, determined in its application as to time by the relative proportions of fetal head and maternal pelvis. The capital operations are both the Porro and Cesarean section, and are dangerous compared with it. I myself should prefer in all cases that the simpler operation should be done, if possible. I have had two cases under my knowledge, in one of which Cesarean section was recommended, but got no further. The woman was scared, and, as the result, sought other counsel. She had had one child born after a very difficult labor. She had had three children craniotomized, and this, the fifth, was born without forceps, by my bringing on premature labor two weeks before full time. The second case was a woman in whom the Cesarean section was performed, although premature labor was perfectly practicable. She had had one child born living, with instruments. The second child was born without instruments, and, although she had a slightly contracted pelvis, it was considered desirable (from a professional standpoint) to perform the operation in the third pregnancy, and she was induced to risk the operation, and it was done. The baby lived about ten months, and then died, showing that the operation subjected the woman to great danger without any commensurate advantage.[1] When we are able at all to get hold of these cases of contracted pelvis where there have been difficult labors or where shortening labor is desirable for any cause, its early induction affords the safest and simplest means of giving both mother and child a living chance.

It is scarcely necessary to add that strict antisepsis is to be observed from first to last.

[1] Since writing the above the same woman has been delivered successfully by induced premature labor.

Forceps and Version.

By JAMES P. BOYD, M.D.,
ALBANY, N. Y.

The degree of shortening in the conjugate diameter of the superior strait is generally regarded as of the highest importance in determining the method of operation in the contracted pelvis. Based upon this measurement, in the works of well-known obstetric writers we find the following rules: that when the conjugate diameter of the brim measures three and a half inches and upward, the proper mode of delivery is by forceps; if the conjugate of the brim is between three and a half and two and three-quarters inches, version is the preferred operation.

But we cannot depend solely upon the length of the conjugate in the selection of a mode of procedure. There are other considerations upon which the selection must depend aside from the number of inches in a given pelvic diameter. The shape of the pelvis; the site of contraction, whether at brim, cavity, or outlet; the size of the fetal head; its degree of ossification; the position of the head; the condition of the os uteri; amount of retraction of the uterus; history of former labors; the number of previous deliveries; the presentation and position of the child; the existence of complications; and, lastly, the dexterity of the operator. These are some of the conditions upon which the selection of a method of delivery must of necessity rest. The size of the fetus will often determine the method of operation.

Schroeder and Balzer have found a progressive increase in the size of the head after the third birth. Schroeder observed that the head of a firstborn is susceptible to much greater moulding than the heads of children born subsequently.

La Torre, in an article relating to the influence determining fetal development, asserts that the degree of fetal development depends largely upon the health of the father; if he be healthy, the size of

his head and shoulders and his stature decide the corresponding peculiarities of the fetus. The weight, stature, and health of the mother exercise a comparatively slight influence upon the fetus.

In the moderate degrees of deformity, as in pelves with a conjugate at the brim of three and a half inches and upward, the forceps may be used with safety. In many of these cases labor may terminate without operation. If the head has engaged, although high, the forceps may be used successfully. If, however, the head is movable above the brim of the pelvis, then version is the safer operation, especially when the membranes are unbroken and os uteri not sufficiently dilated to render forceps advisable.

On account of the careful study of the principle of axis-traction of late years, many changes have resulted in the management of cases where the head is high in the pelvis, and even above the brim. With the aid of the axis-traction forceps it is now possible to deliver the head presenting at the brim with comparatively little risk.

The teaching of the French schools of late years seems to favor the performance of external cephalic version and termination of the labor by the high forceps operation, in many cases where formerly the podalic version was preferred.

In Germany, version is the favorite operation, undoubtedly due in a measure to the views of Sehroeder upon this point. According to this author, an antero-posterior diameter of 3.7 inches generally permits delivery spontaneously; for a less degree of deformity he rejects the forceps even in tentative tractions, advises version, and when the conditions are not favorable for version, Cesarean section or craniotomy.

There is still, however, considerable difference of opinion amongst obstetricians regarding the merits of the two operations, forceps and version, in cases of minor degree of deformity. A conjugate of two and three-quarters inches (seven centimetres) may be considered the lowest limit of version. As the chief cause of danger to the mother after the performance of version is septicemia, only by strict attention to antiseptic measures can favorable results be attained. When the conjugate of the brim then measures between three and a half and two and three-quarters inches, version is clearly indicated and the forceps becomes dangerous.

In order, however, that the operation of version may be successfully carried out, the contraction should be limited to the pelvic

brim, and there ought to be room enough in the transverse diameter.

The advantages of version in contracted pelves are mainly dependent upon the fact that the after-coming head passes more readily the contracted brim than the normal head-first presentation. This is due to the entry of the head by its small bi-mastoid diameter. Tractions upon the trunk of the child bring to bear pressure upon the head from many points in the pelvic walls. The bulk of the head is still further diminished by an overriding of the bones at the sagittal suture. By pressure above the symphysis pubes the head is gradually flexed and forced downward.

According to Cameron, of Montreal:

> In England and America deformity of the pelvis is far less common than on the Continent, and dystocia is more frequently due to impediments at the outlet than at the brim. Hence, except among the immigrant population, version is comparatively rare, while forceps is used so frequently that America has been styled the home of the low-forceps operation.

The child is exposed to many dangers during the operation of version. C. Ruge has observed the following lesions as a result of the extreme traction-force necessary to bring the head rapidly through the narrow brim—fracture of the clavicles, fracture of the humerus, laceration of the sterno-cleido-mastoid muscles, rupture through the substance of a vertebra, extravasations of blood into the cavities of the head and trunk, separation of the condyles from the occiput and of the squamous portion of the temporal from the parietal bones, fractures and depressions of the skull, and rupture of the sinuses of the dura mater.

Dohrn calls attention to the depressing influence exercised upon the fetal heart by pressure brought to bear upon the base of the brain.

If we now turn to the forceps, we find that the injuries to the fetus by this instrument have not been very thoroughly studied. Among the injuries which have been described are fissures in the fetal scalp and depression of the bones of the skull.

Lomer, in twenty-seven cases of fracture of the skull by forceps, found the lesion most frequently in the frontal bone; in six cases the sagittal suture was ruptured, and in four the lambdoid.

Gowers describes cerebral palsies following difficult labor, gener-

ally accompanied by extravasations of blood upon the surface of the brain, ending in death or tedious recovery.

Osler reports nine cases which he has personally observed of children delivered with forceps and palsied. In this connection it is interesting to note that Osiander and Carl Braun describe fissures of considerable depth on the heads of newborn children following easy delivery.

The Cesarean Section.

By E. E. MONTGOMERY, M.D.,
PHILADELPHIA,

AND

A. VANDER VEER, M.D.,
ALBANY.

Dr. Montgomery:

No question seems more appropriate for discussion in this Association than the one before us. Other subjects are of interest from the influence their decision may have upon the health or lives of the individuals affected, but in the discussion of the one now under consideration, we have the lives of two individuals under consideration, the fate of one of whom almost absolutely depends upon the procedure accepted.

For craniotomy it may be pleaded that it had, above all other operations, the justification of antiquity for its performance. Back in the early ages of the development of the obstetrical science, the attendant was confronted with the woman unable to deliver herself, and the sacrifice of the child was accepted as the escape from an otherwise insuperable difficulty. A review of the evolution of the science demonstrates that every step in advance has been aimed at an escape from the necessity for such a sacrifice.

The inherent right of every individual, whether born or waiting to be born, to a chance for life, has through all ages been a recognized principle in morals, religion, and science. With increasing civilization, under the teaching of Christianity, this idea has been more and more emphasized. "Thou shalt not kill" has rung out through the ages, and continually confronted him who, to save the mother suffering, would have needlessly sacrificed the offspring. Science has been continuously besought for measures to decrease the frequency or preclude the necessity for the sacrificial operation. Thus, we have had Cesarean section, forceps, version, premature

labor, and other alternatives instituted. So long as the Cesarean operation was attended with an exceedingly small percentage of recoveries, it was but natural and right that the physician should favor that operation which was attended with only a slight maternal mortality; but, now that the refinements of abdominal surgery have developed procedures which give the child every opportunity for its life, at a very small increase of risk to the mother, over one which was absolutely fatal to the former, the attendant is justified in demanding that the mother accept the increased risk. It may seem unreasonable that the woman should be thus condemned to suffer for a condition of which she was ignorant, and for which she is not responsible; but, on the other hand, the child is not the aggressor; the mother has consented to the conditions which have brought it into existence, and is under moral obligations to afford it an opportunity for its life. It has been said that the patient will not consent to laparatomy, knowing that she may be delivered by the sacrifice of the child, and if we do not accede to her wishes, our patient passes into the hands of some one who is less scrupulous. But should such an argument govern a conscientious and scientific physician? Would not the same course of reasoning lead him to perform abortion when it is inconvenient for the patient to carry the fetus to full development? Has the patient a right to demand that the offspring of her body shall be sacrificed when it can be delivered alive with but slightly increased risk to herself? Can the physician afford thus deliberately to take the life of an individual, at the instance of another, when both lives might be saved? More creditable would it be to follow the example of Dr. Meigs with Mrs. Reybold, after he had twice delivered her by craniotomy, and say, "I will murder no more children for you." Fortunately, she fell into the hands of a man equally scrupulous, by whom she was taken to Gibson, who twice delivered her by Cesarean section, thus affording her children and grandchildren to support and solace her old age.

In a paper entitled "Is Craniotomy Justifiable?" read before the Philadelphia County Medical Society, in 1883, I claimed that as there was but little more than $\frac{3}{4}$ inch between the conjugate of $2\frac{1}{2}$ inches, below which it was acknowledged that Cesarean section afforded an equal, if not better, chance for the mother, and the conjugate of 3.25 inches, the maximum diameter in which craniotomy

was supposed to be necessary, we had reached a period at which we were justified in abolishing the murderous operation of craniotomy from the elective procedures while the child is alive. With the later developments in abdominal surgery, we can not only afford, but it is absolutely incumbent upon us, to urge strongly this dogma. With the proper teaching of the management of pregnancy; with increased accuracy in pelvic measurements, and greater facility in the diagnosis of the relative position and size of the fetus, by external manipulation, the cases in which we will have to resort to such extreme measures will be greatly decreased. To obtain such knowledge would require the obstetrician to acquaint himself with the state of his patient's pelvis and her general condition early in her pregnancy, so that proper measures may be instituted for such relief as may be indicated.

To denounce the operation upon the living child, does not mean that the attendant may temporize until the child is surely dead and then perform craniotomy. Such a course, endangering the mother's life as well, would be more culpable than to proceed at once to the sacrifice of the child. Rather, his knowledge should be sufficient to enable him to decide the probable necessity of the case, and, if the diameters are so small as to preclude the delivery by forceps or other less grave alternatives, to proceed while the patient is in good condition to perform the Cesarean operation.

In considering statistics, we recognize that all the children are sacrificed in craniotomy, and, in addition, that in a large series of cases not all the mothers are saved, consequently the mortality of the operation must be more than 50 per cent. of the lives affected.

Wyder (*Arch. f. Gynäk.*, 88, xxxii. 1–96) reports 168 cases of craniotomy, with a mortality of 14.3 per cent., or, excluding cases in which it was evident the operation was a forlorn hope, a mortality of 8.3 per cent. For the Berlin, Halle, and Leipzig clinics, we have a mortality of 5.6 per cent. In other words, out of every 100 cases of craniotomy (Wyder) there were 108.3 lives lost, to 91.7 saved. In the clinics of Berlin, Halle, and Leipzig, 105.6 lost, to 94.4 saved.

From the statistics of Cesarean section it is difficult to eliminate the cases in which the deathbed was made the scene of surgical display. As Dr. Harris justly says, the Cesarean operation was

often done because it was evident the patient would not outlive craniotomy.

Thus, in America (Harris, *Med. News*, '87, li. 413) 153 cases have been operated upon with 56 recoveries, a mortality of 63 per cent. That this frightful mortality is due to want of appreciation of the importance of early action is evident when we compare it with German results, where 80 cases were done by thirty-eight operators with but 12 deaths, a maternal mortality of 15 per cent. If additional evidence were needed to confirm the assertion that the present mortality is due to failure to operate promptly, we need but direct attention to the cases in which the uterus has been ripped open by cattle; of 9 women so delivered 5 recovered, and 4 children lived. More effective evidence still is that of the 6 cases of self-inflicted operation, where 5 out of 6 recovered. Less than 17 per cent. mortality for self-inflicted operations, with 63 per cent. mortality when done by the profession, conclusively demonstrates that we have permitted the favorable time to pass, in the vain effort to accomplish delivery by some other method.

How could we hope for better results when our instruction has been such as mine—which was, first to try the forceps; if unsuccessful, do craniotomy; failing in that, perform Cesarean section. Necessarily the patient would be *in extremis* when the time came for the latter operation.

It must be remembered, also, that many of the operations accredited to this country were done by the old method, in which death was frequent from hemorrhage or sepsis following gaping of the uterine wound.

The great mortality of the old Cesarean led to the introduction of the Porro operation, in which the danger of hemorrhage and sepsis was sought to be avoided by the supra-vaginal removal of the uterus. For some conditions this is a most desirable operation, particularly where the uterus is much bruised and macerated by a long labor; in septic conditions of the utero-vaginal canal; in parturient fever, metritis, vaginal atresia, or where the superior uterus is the seat of myomata. The disadvantages are, that it removes the power of procreation, requires a prolonged convalescence, and is attended with too large a percentage of mortality to make it acceptable. The gaping of the wound referred to permitted the discharge of the contents of the uterus into the cavity of the peritoneum, de-

veloping sepsis and causing death in the majority of cases. To obviate this, Sänger suggested that a wedge-shaped piece of the muscular wall on either side of the wound should be removed and the peritoneal flaps thus formed be brought together by sutures. Later, it was found unnecessary to remove the wall, but the sutures were so introduced as, first, to approximate the muscular walls, and second, to bring in contact the peritoneal surfaces over this line. This procedure, known as the Sänger or improved Cesarean, is the recognized operation, and the one we would most earnestly recommend in place of craniotomy upon the living child.

As we have already seen, craniotomy is attended with a mortality of 53 per cent. of the lives involved, while the Cesarean operation, under similar circumstances, has a mortality of but 7.5 per cent. of the affected lives.

Should not such an unequal mortality rate induce us to renounce craniotomy when the child is alive? The advocates of craniotomy, however, ignore the child in their anxiety for the mother, and say that it is a mere vegetative existence whose probabilities for life are uncertain. Have we the right to set aside the claims of the child for life? Who can predict the possibilities of the unborn fetus? The history of the world has demonstrated that genius is not hereditary, and we cannot foretell of what possibilities we rob the world by plunging our instrument into the brain of an unoffending child. Is the Cesarean operation the best method of procedure? In some cases it is the only procedure; in others, it is less favorable than the Porro operation. In the cases in which we can elect the time of operation it is the preferable procedure. I cannot better present the position of the Cesarean and Porro operations than in the following communication very kindly sent me by Dr. Harris, whose statistical knowledge of the subject exceeds that of any other author:

"The Relative Status of the Porro-Cesarean, and Sänger-Cesarean Operations.

Porro operations in 15 countries,	267;	women lost	121;	children dead or dying,	49
Sänger " 11 "	196;	" "	48;	" " " "	17
Porro mortality,	1 in $2\frac{1}{5}$				
Sänger "	1 in $4\frac{1}{12}$				
Porro operations of Italy,	92;	women lost,	44;	children dead or dying,	14
Sänger " of Germany,	92;	" "	13;	" " " "	8

Porro operations of Vienna,	37;	women lost, 18;	women saved, 56	per cent.
Sänger " " "	14;	" " 1;	" " $92\frac{6}{7}$	"
Porro operations of Austria,	61;	women lost, 18;	women saved, $70\frac{1}{2}$	per cent.
Sänger " " "	32;	" " 6;	" " $81\frac{1}{4}$	"
Porro operations of Germany,	41;	women lost, 21;	women saved, $48\frac{3}{4}$	per cent.
Sänger " " "	92;	" " 13;	" " $85\frac{1}{2}$	"
Porro operations of the United States,	9:	women lost, 7;	women saved, $22\frac{2}{9}$	per cent.
Sänger " " " "	33;	" " 18;	" " $45\frac{15}{33}$	"

Sänger operations in Dresden	under 6 operators,	31;	women saved,	27			
" " " Leipzig	" 6	"	20;	" "	18		Loss 8 women, or 1 in $9\frac{1}{8}$
" " " Berlin	" 5	"	8;	" "	7		
" " " Vienna	" 6	"	14;	" "	13		
			73		65		

"Mr. Lawson Tait's preference for the Porro operation is based upon a personal experience which is quite different from that of Continental operators. He says that he performed the Cesarean operation four times and lost every case, and the Porro operation as many times without a death. As he has given the particulars of but one (a Porro) operation out of the eight, we are left in ignorance as to the prior condition of the women upon whom his four Cesarean sections were made, and his method of closing the uterine wound. Mr. Tait is certainly not wanting in skill, and there must be some other reason for his failure, when Dr. Korn, of Dresden, has saved seven Sänger cases in order; Prof. Zweifel, of Leipzig, seven out of eight; Dr. Sänger five in order; and Prof. Gustav Braun, of Vienna, also five. As the last operator lost five Porro cases out of seven, two of them by dropping in the stump, and has not for a long time tried the Pavian method, he probably prefers the Leipzig operation as the safer of the two.

"The Sänger operation has the more rapid convalescence of the two. I have known a woman travel two hundred miles on the nineteenth day after her operation, without injury.

"It has the advantage that it does not unsex the woman, and does not leave her with an in-drawn abdomen.

"The Porro operation is of advantage in cases of malacosteon, as it will sometimes cure the disease.

"It is preferable where the fetus is dead and putrid, as it removes the uterus with its septic contents.

"It may be worthy of preference where the woman is unmarried; but the sterile result may be more safely obtained, in some cases, by ligating the Fallopian tubes, as was done by Lungren, of Toledo (1880), and Champneys, of London (1888), with entire success.

Yours truly,

ROBERT P. HARRIS.

September 4, 1889.

We believe that the history of the development of the science demonstrates:

1. That craniotomy, as an elective operation on a living child, is unjustifiable.

2. That in cases in which the condition has been overlooked, and the woman comes to full term with a pelvis contracted sufficiently to preclude the delivery of a living child *per vias naturales*, the Cesarean operation should be performed.

3. The improved Cesarean operation, barring exceptional cases, is preferable to the Porro.

4. It should be done, where possible, prior to the beginning of labor, and under aseptic precautions.

The Cesarean Section.

Dr. Vander Veer:

The discussion of the Cesarean section as an alternative of craniotomy on the living child, is inseparable from the other surgical proeedures designed for the delivery of a living child—the operations of Porro and Thomas. As an abdominal surgeon, one is bound to be conversant with each of these varieties of procedure, and the special indications for the employment of each. Poorly equipped is he who has but one resource in the treatment of eases where supra-pelvic delivery is demanded. Hence, if in the diseussion of Cesarean section I should refer to the other methods of treatment which have been assigned to so capable gentlemen as Drs. Reed and Price, I hope I shall be pardoned.

Cesarean section is an operation of great antiquity, reaching so far into the past that its origin is obscure. It has been self-inflicted by those suffering the pangs of labor. The goring of horned cattle has been responsible for Cesarean section in eleven cases. It is performed by the native surgeons of tribes of Africa, as well as by the surgeons of all civilized nations. If horned cattle could be prevailed upon to exercise more care in the selection of their cases, and to declare the special indications which have hitherto led to the operation, it might be well to encourage them, for Dr. Harris has shown them to be exceedingly fortunate in their results. The so-called classie Cesarean section will be carefully avoided in this discussion, believing that the improved operation of Sänger and others has been of great advantage in the technique of the operation.

In 1870, Prof. T. G. Thomas revived the procedure developed by Jörg, Ritgin, and Sir Charles Bell, because of the great mortality of the Cesarean section. Prof. Porro, of Pavia, from the same motive as Thomas, designed and for the first time employed supra-vaginal amputation of the pregnant uterus, or Porro's operation. The advancements in abdominal surgery made in the past

decade have been of incalculable advantage to humanity, but there are yet certain elements which need to be brought more closely and persistently to the attention of the profession at large, among these being the question of the time for operation. Nothing has contributed so much to the high rate of mortality, after Cesarean and other of the major abdominal operations, as procrastination. Being the handmaid of Nature, two or three attempts at version or craniotomy, two or three long-drawn-out consultations, "waiting for better light in the morning," and other similar pretexts, have sent more than one unfortunate victim to an untimely grave. Teachers and writers must keep constantly before the profession the necessity for speedy interference, the propriety of early consultation, if necessary and possible, with able men of positive convictions, and decide on one, not many plans of treatment, and immediately carry it into effect. Then, and not till then, will many of the more fatal abdominal operations be placed upon a sound basis. Then the histories of patients "moribund," "very much exhausted," "very feeble at time of operation," will not occur, and unfortunate results will not be so frequently recorded.

With very few limitations, if any, I am of the opinion that the destruction of a living child by craniotomy or embryotomy is unjustifiable. It is true that cases of dystocia which, in order to be terminated, will require surgical interference, oftenest occur among those women that seldom employ an obstetrician until the onset of labor—if, indeed, they are not left entirely to the care of ignorant midwives. Because of this, induction of premature labor cannot be brought about. Again, there are cases where contraction and distortion of the pelvis are so great that craniotomy is dangerous, even more dangerous than Cesarean section (see statements of Drs. Bayo and Harris).

The *American System of Obstetrics* gives a *résumé* of 149 cases of the improved Cesarean section, saving 108 women and 136 children (the fate of 3 children not stated). In Germany, where surgeons are nothing if not technical, 80 operations with 12 deaths have been reported. Austria, 17 cases, with 12 women and 15 children saved. We have been in America, so far, less fortunate —22 cases, with a loss of 13 women, but only 3 children. By comparison, the Porro operation and its modifications has been done 232 times, and in every country has been much more fatal than

the Cesarean section. In England the Porro operation, owing to its enthusiastic advocacy by Mr. Tait and others high in authority, is in the ascendancy. They have been especially fortunate in their results. Lapara-elytrotomy has been done fourteen times, eleven in America, twice in England, both fatal, and once in France, also fatal. Seven mothers and seven children survived the operation. Five of the cases that recovered were favorable for any operation, two were unfavorable. The causes of death following lapara-elytrotomy have been shock, peritonitis, septicemia, and in five cases wounds of the bladder occurred as a complication. The causes of death following Porro's operation were shock, hemorrhage, peritonitis—in all respects similar to the causes following the Cesarean. Regarding difficulties of the technique of the operations, there is no great difference. The difficulties of one are counterbalanced by difficulties of the other. However, for the unequipped the Cesarean would doubtless prove the easiest to perform, but there are already so many good abdominal surgeons that they are accessible in all parts of the country. In any of the operations great manual dexterity is required. The range of the applicability of the Cesarean is of all the greatest, followed by that of Porro, with lapara-elytrotomy in the least range of usefulness. The avowed purpose for which the operations of Porro and Thomas were instituted—*i. e.*, the lessening of the mortality of supra-pelvic delivery,—has failed to meet the expectations of their advocates. Probably lapara-elytrotomy will soon, if not already, be replaced by either the Cesarean section of Sänger or the operation of Porro.

I predict that another decade will have relieved Cesarean section of many of its terrors; that the mortality will not be greater than 15, and maybe less than 10 per cent.; and these results will be attributable to a livelier interest exhibited by the profession at large to improvements in the technique of the operation, and withal a more skilled class of operators.

Lapara-elytrotomy.

By CHARLES A. L. REED, M.D.,
CINCINNATI.

Lapara-elytrotomy was born of two ideas: the first was that the living, unborn child has rights which the obstetrician is bound to respect; the second idea is the one which has not lived so long as has the first, and was the bugbear which obtained as to the sacredness of the peritoneal cavity.

We all remember the era of abdominal surgery, not long since past, when the dictum went forth from those high in authority, that the treatment of perforating wounds of the abdomen should consist in sealing the wound and leaving the patient to fate. That time has passed, and it has passed because such progressive, such aggressive men as Tait and his coterie, whose influence extends not only over England but America, together with such men as Sänger and his followers on the Continent, have demonstrated the fact that the peritoneal cavity can be invaded with comparative impunity. The first idea, therefore, which prompted the procedure of Thomas, still obtains, namely, that the living child should, if possible, be delivered alive. The second idea has ceased to be of force in the practical surgery of to-day, because we invade the peritoneal cavity with a greater degree of impunity than formerly.

The operation of Thomas consisted in making an incision along the line of Poupart's ligament, lifting the peritoneum, and opening the vagina just below the cervix—a tear rather than a cut—and delivery was effected through this incision. By this manipulation the peritoneal cavity was not opened. The operation was devised by Thomas, repeated by him, adopted by Skene, and repeated in the hands of several other operators, not the least distinguished being our honored president in association with Prof. Dandridge, of this city.

I will not detain you with the statistics of the operation. The

technique is comparatively simple. I have not adopted this operation in obstetric practice. I have done the modified operation, however, for the relief of pelvic abscess, in my early surgical work, when I desired to avoid the peritoneal cavity. I have even gone to the extent, in two cases, of making a counter-opening into the vagina. It is comparatively simple, however, in theory, though the obstetric conditions vary largely from the non-puerperal condition. It is extremely difficult, in making this section, to know just when you are encountering the bladder, because it is compressed between the impregnated uterus and the other parts; and this condition is further aggravated by the progress of labor which has gone to the extent, generally, of dilatation of the cervix at the time of the operation. The ureters, also, are usually compressed. There is another objection to the operation, namely, that it is not generally undertaken until the third stage of labor, when the uterus has perhaps thoroughly exhausted itself. By the operation of Thomas we have no means at all of determining the condition of the uterus. If we perform the Cesarean operation, we may not only ascertain the condition of the uterus, but, if necessary, we can ablate that organ.

The Porro Operation.

By JOSEPH PRICE, M.D.,
PHILADELPHIA.

The true Porro operation is, as we know, the Cesarean section, to which is added the removal of the uterus. At first sight, it might be considered that to perform the Porro operation is to add one capital procedure to another, thus enhancing the dangers and the difficulties, and accordingly increasing the mortality. This is not true, for, by removing the uterus, we take away from the Cesarean section the most important factor in its dangers—that is, the succulent uterus with its incision. Another way of stating the argument is, that the operation is simply a supra-vaginal hysterectomy, with the complication of pregnancy, instead of that of a fibroid tumor. In my paper on "Supra-vaginal Hysterectomy," I endeavored to show that an uncomplicated operation of this sort, with the extra-peritoneal treatment of the stump, is, under the improved technique, an operation of comparatively little danger. The later operations in Philadelphia alone have gone far to make this position tenable. The operations in the hands of other skilful men also confirm the statement. The results of men without the abdominal instinct have no right to be considered.

Now the complications of hysterectomy, when they involve no important viscus, but are limited to simple adhesions, with intelligent drainage, are not to be feared. I wish to call your special attention to these points in detail, because I intend to use them comparatively. In the Cesarean section the danger of hemorrhage as an ever-present menace is not to be denied. Of course, it can be controlled, but it is present, nevertheless. In the Porro operation the uterus is strangulated at once, thus obviating this complication. Now, as an operative procedure, compared with the Cesarean section, the Porro operation clearly has the advantage in these essential points: first, in the absence of danger of hemorrhage; second, in

the extra-peritoneal treatment of the cut uterus; third, in the rapidity with which the operation can be completed. It appears, also, that even with the bettered results of hysterectomy, the Porro operation ought to surpass them for the following reasons: first, there are no complications of adhesions; second, there is no implication, either directly or indirectly, of any important viscus, and, accordingly, there is less hemorrhage; third, there is less shock. So far as the technique of the operation is concerned, it is less complicated than that of the simple Cesarean section, and in its complications far less formidable than the average hysterectomy. The suturing of the uterus, as necessary in Cesarean section, prolongs the operation and imposes a time consideration that is of vast importance in all abdominal operations. The factors of uncertainty in the healing of the uterine incision contradict, and in great part negative, all our established ideas of exact surgery. We have here an incision which it is impossible to put at rest. The tissue within the embrace of the ligature is not at rest. The uterine tissue itself is not stable, but is undergoing metamorphosis and degeneration. A suture such as this in any other part of the body would be unthought of by the intelligent surgeon. It is only tolerated here because it is the best that circumstances and anatomical surroundings will permit. Under such conditions the dangers of leakage and peritonitis are always present in no small degree, and cannot be minimized. This is not true of the extra-peritoneal treatment of the succulent stump. Here the use of the serre-nœud is the ideal treatment, because it adapts itself to the conditions, in that it can be contracted upon the shrinking stump, and the hemorrhage absolutely controlled.

The operative side of the question has thus been conclusively dealt with, I think, and the showing is not unfavorable to the Porro operation. There remains to consider the ethical or, if you please, the sociological side of the question. First, the interests of society in general: when we remove the uterus, we sterilize the woman. Have we a right to do so? To answer this we must ask in what light is the pregnant woman to be considered? Is she to be simply regarded as a propagating organism, whose life is in no wise to be considered apart from her procreative power, to which all else must be sacrificed? Are her relations to family and friends of no account compared to this? Is the Cesarean section, which gives her a pos-

sible chance for future childbearing to the detriment of her present family, to be preferred to the operation which gives her the best chance for future usefulness apart from childbearing? Before we answer these questions, the subject must be looked at from the standpoint of the children delivered by Cesarean section. It must be remembered that the dangers of childbirth are here enhanced, and the chances of living greatly diminished. If we then choose the Cesarean section in order to permit future childbearing, we are doing so with a knowledge that we are subjecting the mother to its perils, without reasonable assurance that this can be compensated for by the value of the life of her child. Mathematically, we are substituting a variable for a constant. The logical deduction from the last statement is, that with a dangerous operation we are not justified in exposing the mother again to its perils, when the ends attained are in no wise certain to be what is desired.

In other words, the Porro operation, skilfully performed, is safer than the Cesarean section, and practically leaves the mother, so far as the ultimate results are concerned, in the same relative position to the community as a childbearing agent.

This answers the first series of questions; for if, with less danger to herself, she is left in the same relative position, it is her right to demand, and the surgeon's duty to perform, the operation which will preserve her usefulness to her family and the community.

I subjoin the following statistics for reference:

Porro, 9 deaths in last 50 operations; 12 children lost in 81 operations.—*British Medical Journal*, March 30, 1889.

Last four years Porro mortality 19 per cent.; Sänger, 26 per cent.—*British Medical Journal*, April 13, 1889.

Conclusions: A Résumé of the Whole Subject.

By WILLIAM H. WATHEN, M.D.,
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In closing this discussion I will limit my remarks to a few of the important facts bearing upon the question of craniotomy and some of its alternatives, and will give reasons why embryotomy on the living child is not justifiable; I will also suggest the alternative that may be substituted to meet the conditions of any particular case.

Craniotomy is of great antiquity, antedating the time of Hippocrates, and it was probably practised by the Egyptians during the reign of the Pharaohs; it is an operation that has generally been championed by ignorance and often practised with seeming brutality. Fortunately, with the advance of the science of obstetrics and other collateral branches, a more general diffusion of knowledge, and a more correct appreciation of our moral and professional responsibilities, the medical profession now recognizes that the field of embryotomy is curtailed; and the tendency of science is to eliminate this operation on the living child from obstetric procedures. I believe that the alternatives—abdominal section, induction of premature labor, etc.—will give results that will justify its total exclusion, but this presupposes that these operations should be cases of election, and not done as a last resort. Unfortunately, the statistics of embryotomy have not been carefully or correctly kept, and we are unable to get at accurate conclusions as to its probable mortality, compared with the mortality shown by the more carefully prepared statistics of abdominal section and the induction of premature labor. We are sometimes told that embryotomy should have a very low mortality, and we occasionally see statistics that appear to justify this assertion; but many of the cases operated on were women who had previously given birth to living children, or who could have been delivered by the induction of premature labor, or at term unaided, or by the forceps or version. The

German statistics are particularly faulty in this respect, and Leopold's report of 20 consecutive cases delivered by craniotomy without a death is no fair criterion, for the conjugata vera diameter was 7.50 centimetres (nearly 3 inches), and in such cases craniotomy if carefully done should have a very low mortality; but it is contraindicated, and some one of the alternatives would give nearly as good maternal results, and would save most of the children. No better results are obtained in craniotomy than in England; they dread Cesarean section because of its local fatality, and prefer craniotomy in cases of pelvic deformity of low grade. Parry gives the British records in pelves of $2\frac{1}{2}$ inches or less at about 20 per cent. De Soyre gives 52 cases of embryotomy in pelves less than 2.15 inches with 31 recoveries and 21 deaths, a mortality of 41.38 per cent.; and Maygrier 67 cases in pelves from 2.53 to 1.40 inches, with 39 recoveries and 28 deaths, a mortality of 41.79 per cent.; of these cases, 31 were in pelves measuring 2.34 inches at the highest, with 17 recoveries and 14 deaths, a mortality of 45.16 per cent. Rigaud and Stanesco give a mortality in 122 cases of embryotomy at 38.52 per cent. These are probably the most reliable statistics until very recently, and it will be observed that the conclusions are relatively uniform.

Dr. Wyder (*German Gynecological Society*, September 21, 1887), in 167 craniotomies from the obstetric polyclinic at the Charité, gives a percentage of 14.50 mortality; of these cases, only 126 had contracted pelves. In Carl Braun's Clinic, 1881 to 1885, craniotomy was done 49 times with 8 deaths, a mortality of 16.30 per cent.

Thorn (*Arch. für Gynäk.*, vol. xxiv. page 437) reports 80 cases from the Halle Clinic with 10 deaths, a mortality of 12.50 per cent.; and Merkel (*Arch. für Gynäk.*, vol. xxi. page 461) reports 100 cases with 8 deaths, a mortality of 8 per cent. That we may appreciate how very simple these cases were, it is only necessary to know, that of Thorn's list of 56 multiparæ, 39, and of Merkel's list of 68 multiparæ, 49 had given birth to living children, and most of them could probably have been delivered *per vias naturales* of living children.

No one will contend that craniotomy carefully performed should have any considerable mortality in such cases, but it will be claimed that some of the alternatives should be practised in the interest of

the child, for surely it has some claims to our protection. The following from Barnes is quoted in defence of embryotomy: "Craniotomy done under fair conditions, such as are postulated for Cesarean section—that is, done at a chosen time, with due skill—does not involve any maternal mortality." But the force of this argument is practically destroyed by his further statement (*British Gynecological Journal*, Part viii., 1886, page 315) that, if we save the life of the mother by sacrificing the child, she may afterward be delivered of living children by the induction of premature labor. As it is conceded that few children are born alive in pelves of less diameter than 3 inches conjugata vera, we may logically conclude that most of Barnes's cases had a diameter of 3 inches or more.

Wyder (*Archiv. f. Gynäk.*, vol. xxxii. page 1) gives the mortality of 215 cases of craniotomy at Berlin, Halle, and Leipzig at 5.60 per cent., but he gives no detailed account of the exact indications, and most of the cases were presumably the lesser forms of pelvic contraction. It will not be gainsaid, that craniotomy is often done on living children in cases where the women could have been delivered by the unaided efforts of nature, or by means that would have saved the lives of both mother and child; and any physician of large observation and experience knows of instances where a physician, or several physicians, had decided that craniotomy was necessary, but while preparing to operate, or because of delay occasioned by the refusal of the woman, her family, or her spiritual adviser, to have the operation done, a living child was born. It is a conspicuous fact, that the operation is relatively more frequently done by men who are comparatively ignorant of the science of obstetrics; as men become learned in obstetrics, the operation becomes less frequent. Collins performed craniotomy once in 141 cases of labor; Clark once in 248, and Ramsbotham once in 805; but Siebold performed it only once in 2095 labors; Baudelocque once in 2898 cases, and Moore Madden has never recognized its necessity or countenanced its performance. (*British Medical Journal*, October 2, 1887, page 627.)

As remarked by Dr. Busey, "The extraordinary frequency in the practice of some competent obstetricians is explicable only upon the theory of an automatic belief in its justifiability, which involves the more 'sweeping doctrine of necessary blamelessness for erroneous

conclusions' (Gladstone), or the favorite and broader doctrine of Ingersoll, 'The immunity of all error in belief from moral responsibility.'"

The *future welfare* of society and of State is practically ignored by the embryotomist; he sees nothing beyond the *present*, and is controlled by the belief that the mother is of much more immediate use to the family, society, and State, than the unborn child, and, therefore, it may be sacrificed. This belief probably had its origin in that ancient philosophy so forcibly enunciated by Cicero, and taught by moralists of all ages, that the life of the weaker and less useful, or that life which is of less value to State or society, may be sacrificed to protect the life of that person who is of greater value to State and society.

"Quid, si in una tabula sint duo naufragi, hique sapientes, sibine uteruis rapiat, an alter cedat alteri? Cedat vero; sed ie, cuius magis intersit vel sua, vel republicæ causa, vinere. Quid, si hæc paria in utroque? Nullum erit certamen sed, quasi sorte aut micando victus, alteri cedat alter." (*Cicero, de Officiis*, Book III., xxiii., Pereya's ed.)

While pagan and stoic philosophers and moralists have been nearly unanimous in defence of this principle, such is not true of Christian philosophers and theologians. With few exceptions, theologians of the Catholic Church have always contended that embryotomy on the living child is forbidden by the commandments. This question was finally decided by Rome in 1884.

The decision of the Holy Office, in answer to the *dubium* of the Cardinal Archbishop of Lyons, is against the lawfulness of craniotomy on the living child, or at least *tuto doceri non posse*.

"Eminentissimi P. P. mecum inquisitores generales in congregatione generali habita Freia IV. re 28 labentes maii, ad examen revocarunt dubium abeminentia tua propositum 'an tuto doceri possit in scholis catholicis licitam esse operationem chirrurgicam quam cranotomiam appellant, quando scilicet, ea omnisa, mater et filius perituri sint; ea contra admissa salvanda sit mater infantis pereuntes?' Ac omnibus diu et mature perpensis, habita quaque ratione eorum quæ hac in re a peritis catholicis viris conscripta ac ab eminentia tua huic Congregationi transmissa sunt, respondendum esse duxerunt: 'Tuto Doceri Non Posse.'"

Practically, the philosophy which justifies the killing of an inno-

cent person to save the life of another, if ever true, is not usually applicable to embryotomy, for women who have previously given birth to living children, or who have pelves large enough to give birth to living children in subsequent pregnancies, can generally be delivered without sacrificing the child. The exceptions are, in cases of monsters, hydrocephalus, etc. But in cases where it is claimed the operation is indicated, the women have usually had no living children, nor are they capable of having any; so their existence is necessary only so far as they are able to contribute to the immediate interest and welfare of husband, society, and State, and at death their usefulness is ended. In such instances, the killing of the child would be largely a selfish matter, for it may, without materially endangering the life of the mother, be delivered alive by abdominal section; it may then become a useful member of society and State, and produce children that may continue to multiply and do likewise.

The destruction of life by craniotomy is so great, and the injury to society and State so manifest, that it is our professional, moral, and political duty to substitute some of the alternatives in the interest of the child, if we can do so without doing injustice to the mother.

Nearly seven thousand children are sacrificed annually in the United States by embryotomy. This estimate is based upon the most favorable mortality reports of less than ten per cent., with a population of sixty millions, and one craniotomy (Tyler Smith) in every three hundred and forty labors.

At the close of a few generations the loss would be relatively very great.

Let us now briefly consider the results to mother and child where the alternatives have been adopted. We will not waste time considering the old statistics of Cesarean section where the operation was performed crudely with none of the modern and more successful modifications, and generally only as a *dernier ressort*, for in such cases it is not possible to get good results. Nor will we consider the results of lapara-elytrotomy, for this operation is too complicated for general adoption, and in the practice of expert operators has not given as good results as the improved Cesarean section, or Porro's operation. Nor is it hardly fair to include the statistics of the improved Cesarean section, or Porro's operation, in the United States, for nearly all these operations have been done after exhausting

all other means, with the women nearly dead, and seldom as operations of election.

The following are the most complete statistics available on the improved Cesarean section, Porro's operation, and the induction of premature labor, for which I am largely indebted to the courtesy of Dr. R. P. Harris, of Philadelphia.[1]

It will thus be seen that Porro's operation has saved in all countries 54.33 per cent. of the mothers, and 82.77 per cent. of all the children, or 137.10 lives out of 200 involved, while the improved Cesarean section has saved 75.77 per cent. of the mothers and 93.81 per cent. of the children, or out of a total of 200 lives has saved 169.58 lives. But if we very properly exclude the improved Cesarean operations in the United States, 81.48 per cent. of all the mothers were saved, thus saving out of 200 lives 175.29 lives. The above is conclusive that Porro's operation can only be substituted in exceptional cases for Cesarean section, unless future results materially change the statistics. So far as concerns the mothers, however, the results of 1888 are apparently in favor of Porro's operation, unless we again exclude the United States, the percentage being 84.61 against 78. By excluding the United States the improved Cesarean section gives a success of 85.71 per cent.

It will be seen from the following statistics collected by Spiegelberg in 1870, and by Litzmann, from the best authorities, that premature labor induced, and premature labor in contracted pelves, have not given as good results as the improved Cesarean section or Porro's operation. In Spiegelberg's 219 cases, 84.90 per cent. of the mothers and 32.10 per cent. of the children were saved, or 117 lives were saved out of 200; and in the 34 cases of Litzmann 44.20 per cent. of the mothers and 47.35 per cent. of the children were saved, or 101.55 lives were saved out of 200. In Litzmann's statistics of premature labor in small pelves a percentage of 68.80 of the mothers were saved, and 68.75 of the children, or 137.55 lives were saved out of 200.

Maygrier gives the results of induced labor in pelves of 2.73 inches and below, as follows: Mothers saved, 66.67 per cent.; children saved, 35.30 per cent.; or 101.97 lives saved out of 200. These are the best results that have been obtained, and the percent-

[1] See page 387.

Porro-Cesarean Operations.

No.	Countries.	Operators.	Localities.	Cases.	Women saved.	Women lost.
1	Italy	52	35	92	48	**44**
2	Austria	15	7	61	43	**18**
3	Germany	27	18	43	22	**21**
4	France	9	7	17	6	**11**
5	England	10	2	12	5	**7**
6	Russia	6	4	10	7	**3**
7	United States	9	7	9	2	**7**
8	Belgium	4	3	5	3	**2**
9	Scotland	4	2	5	1	**4**
10	Switzerland	2	2	4	3	**1**
11	Holland	2	2	2	1	**1**
12	Australia	2	2	2	2	**0**
13	Spain	1	1	1	0	**1**
14	Mexico	1	1	1	0	**1**
15	Japan	1	1	1	1	**0**
				265	144	**121**

26 operations, with 4 deaths, in 1888.

Sanger-Cesarean Operations.

No.	Countries.	Operators.	Localities.	Cases.	Women saved.	Women lost.
1	Germany	44	22	92	79	**13**
2	Austria	13	7	32	26	**6**
3	United States	24	13	32	15	**17**
4	Russia	7	5	10	7	**3**
5	Holland	5	5	9	9	**0**
6	Italy	3	3	7	5	**2**
7	France	2	1	4	2	**2**
8	England	3	2	3	1	**2**
9	India	1	1	2	1	**1**
10	Switzerland	2	1	2	1	**1**
11	Denmark	1	1	1	1	**0**
				194	147	**47**

68 operations in 1888. 56 in Europe, with 8 deaths.
12 in the United States, with 7 "
68

age of lives saved might be materially lowered by deducting those children that died within a few days or weeks after birth.

In the statistics of Regand and Stanesco in induced labor in pelves from 3.51 inches to 1.95 inches, 69.81 per cent. of the mothers were saved and 30.09 per cent. of the children, or 100 lives were saved out of 200. In pelves between 2.34 and 1.95 inches more than half the mothers and all the children died; so it will be seen that labor in pelves below 2.34 inches cannot be induced in the interest of the child. The most encouraging statistics of induced labor are given by Wyder (German Gynecological Society, 1887). He reports 98 cases in which 91.80 per cent. of the mothers were saved and 52 per cent of the children, or 143.80 lives were saved out of 200; but the conditions that indicated the induction of premature labor are not clearly given, and many of the pelves were probably relatively large.

The report by Wyder (*Archiv f. Gynäk.*, vol. xxx. p. 1) of 306 cases of premature labor, with a mortality of 3.90 per cent., is not worthy of consideration in this connection, and should not influence us in adopting the alternative of premature labor.

While the induction of premature labor shows results much worse than the improved Cesarean section, there are instances where it is a better alternative to craniotomy, and, therefore, the following facts may be useful:

It is never wise to induce premature labor in pelves with a conjugata vera less than 2.50 inches; the fetal head at seven months being only 2.70 inches in its biparietal diameter may be compressed 0.39 of an inch by the uterine contractions, thus enabling it to pass through the pelvis. If the contraction is not so great, pregnancy may continue longer, since the biparietal diameter measures at seven and a half months 2.90 inches, at eight months 3.10 inches, at eight and a half months 3.30 inches, at nine months 3.50 inches, and at term 3.70 inches.

That the Porro operation is preferable to the Cesarean section in some cases no one will deny, and Sänger gives the following indications for its performance:

1. "When the discharge of lochial secretions is rendered difficult or impossible *per vias naturales—i. e.*, by stenoses and atresiæ of the cervix and vagina, or by tortuosity and compression of the soft obstetric canal, due to a tumor not belonging to the uterus."

2. "By pregnancy in the closed-up half of a *uterus bicornis*, in which delivery is preferably effected by establishing an artificial opening toward the open half (strictly speaking, this is not a true Porro operation, since the remaining half of the uterus may be again impregnated)."

3. "When infection of the corpus uteri is evident."

4. "After repeated classical sectio-Cesaria."

5. "By serious osteomalacia."

When delivery *per vias naturales* is prevented by uterine or abdominal tumors, the alternative to craniotomy is to remove the tumors if it is possible to do so, otherwise the Porro operation is the proper alternative. Porro's operation is also indicated in ruptured uterus where the rent extends through all the coats, whether the child is in the abdominal cavity, the uterus, or has been delivered. If the blood, the bloody serum, and liquor amnii be thoroughly removed from the peritoneal cavity before decomposition or inflammation, the operation offers but few additional dangers and removes many. But the operation should be done immediately, for all the pathological changes are against the late operation. The woman may have recovered from the shock, but adventitious sacs, plastic adhesions, etc., will have formed, will prove troublesome, and will prevent success.

The above justifies the conclusion, that the risk to the mother in timely operations, and in cases of election, in abdominal section for the removal of a living child, is not greater than in embryotomy, and when the medical profession correctly appreciates this genuine truth, mutilating operations on the child will be relegated to their proper sphere, viz., cases where the pelvis is relatively large and the fetus is dead.

Since writing the above, I have received the following letter:

DEAR DR. WATHEN: Cesarean statistics are changing every day, and do not hold good very long, as about 6 Sänger operations are performed on an average monthly, and I am daily watching Case 208 on my list. If she recovers (this is her tenth day), it will make 16 out of 34 for the United States, and 157 out of 208 for the world, in twelve countries, with 187 children also saved. The Porro operations are 269 with 147 women saved, and 229 children delivered alive. So you see the Sänger leads in results to women, with 61 less operations.

Yours truly,

ROBERT P. HARRIS.

OCTOBER 17, 1889.

INDEX.

Abdominal surgery, influence of, upon general surgery, 92
need of specially trained men for, in remote districts, 257
operations, some accidents and complications incident and subsequent to, 100
Abortion, 356
peculiarities of, from natural causes, 275
Address of welcome, xxviii
Allen, Henry Bigelow, xix

Baker, Washington H., xix
Banta, Rollin Ledrue, xix
rectification of face presentations, 45
remarks on rectification of face presentations, 53
remarks on treatment of ruptured parturient uterus, 35
Barrow, David, xix
how the refinements of abdominal surgery have influenced general surgery, 92
Beckwith, Frank E., xix
Boyd, James Peter, xix
forceps and version, 362
Branham, Joseph H., xix
Burns, Bernard, xix
By-laws, xii

Carson, Norman Bruce, xix
Carstens, J. Henry, xix
remarks on extra-uterine pregnancy, 21
remarks on treatment of ruptured parturient uterus, 35
remarks on intra-uterine amputation of forearm, 43
remarks on rectification of face presentations, 52
remarks on flap-splitting in perineorrhaphy, 76
successful removal of a fibroma of the right ovary during pregnancy, 151
Cesarean section, 366, 373
Clarke, Augustus Peck, xx
management of the perineum during labor, 206
Comegys, C. G., address of welcome, xxviii

Conklin, William Judkins, xx
some neuroses of the menopause, 301
Constitution, xi
Craniotomy, discussion on, 351
Cushing, Clinton, xx
ligatures and sutures, 168

Davis, W. E. B., xx
Dean, George R., xx
need of specially trained men for abdominal work in remote districts, 257
Douglas, Richard, xx
Drainage, reasons for, in ovariotomy, 188
Dunlap, A., remarks on accidents and complications of abdominal and pelvic operations, 116, 121
remarks on influence of abdominal surgery upon general surgery, 116, 121
Dysmenorrhea, treatment of, 220

Eliot, Llewellyn, xx
treatment of umbilical hemorrhage, 202
Executive session, minutes of, xxvi
Extra-uterine pregnancy, 9

Face presentations, rectification of, 45
Fellows, corresponding, xviii
honorary, xviii
ordinary, xix
Fibroma of right ovary, successful removal of, during pregnancy, 151
Flap-splitting in perineorrhaphy, 54
Forceps, use of, to rotate head in labor, 241
and version, 362
Forearm, intra-uterine amputation of, 41

Gardner, William Sisson, xx
sapremia and septicemia during the puerperal period, 312
Genu-pectoral position in obstetrics, 331
Glasgow, Frank A., xx

Hall, Rufus Bartlett, xx
remarks on hysterectomy, 163
remarks on influence of abdominal surgery upon general surgery, 120
remarks on accidents and complications of abdominal and pelvic operations, 120
remarks on drainage after ovariotomy, 196
some points in the diagnosis of pyosalpinx, 230

Head, use of forceps to rotate the, in labor, 241
Hemorrhage, umbilical, treatment of, 202
Hill, Hampton Eugene, xx
reasons for drainage in ovariotomy, 192
remarks on drainage in ovariotomy, 200
Hoffman, Joseph, xx
premature labor, 358
remarks on extra-uterine pregnancy, 15
remarks on flap-splitting in perineorrhaphy, 74
remarks on accidents and complications incident and subsequent to abdominal and pelvic operations, 122
remarks on intra-pelvic inflammations, 133
remarks on treatment of ruptured parturient uterus, 35
remarks on hysterectomy, 160
remarks on drainage in ovariotomy, 194
remarks on peritoneal effusions, 194
some accidents and complications incident and subsequent to abdominal and pelvic operations, 100
Hysterectomy, vaginal, 140
dry extra-peritoneal treatment of stump in, 149

Ill, Edward Joseph, xx
the forceps as a means of rotating the head in labor, 241
Inflammation, intra-pelvic, pathology and treatment of, 123
Insane, history of ovariotomy on the, 262
Intra-pelvic inflammation, pathology and treatment of, 123

Jarvis, George Cyprian, xx

Kellogg, John Harvey, xx
observations concerning the functions of the round ligaments, 266
Knee-elbow position in obstetrics, 331

Labor, premature, 358
Lapara-elytrotomy, 376
Ligaments, round, observations concerning the functions of, 266
Ligatures and sutures, 168
Lothrop, Thomas, xxi

McArdle, Thomas Eugene, xxi
case of metremphysema, 227
McMurtry, Lewis Samuel, xxi
case of extra-uterine pregnancy, 9
remarks on drainage after ovariotomy, 199
remarks on extra-uterine pregnancy, 23
remarks on influence of abdominal surgery upon general surgery, 108

McMurtry, Lewis Samuel, xxi
remarks on accidents and complications of abdominal and pelvic operations, 108
study of the pathology and treatment of intra-pelvic inflammations, 123
Manton, Walter Porter, xxi
history of ovariotomy on the insane, 262
Marcy, Henry Orlando, xxi
the animal suture, 279
Maxwell, Thomas Jefferson, xxi
Menopause, some neuroses of the, 301
Metremphysema, case of, 227
Miller, Aaron Benjamin, xxi
Minutes of second annual meeting, xxvii
of executive session, xxxvi
Montgomery, Edward Emmett, xxi
Cesarean section, 366
response to address of welcome, xxix
remarks an extra-uterine pregnancy, 12
remarks on intra-pelvic inflammations, 131
remarks on vaginal hysterectomy, 164
remarks on drainage in ovariotomy, 192
vaginal hysterectomy, 140
Moses, Gratz Ashe, xxi
Myers, William Henchel, xxii
peritoneal effusions after intra-peritoneal operations, 177
remarks on peritoneal effusions, 200

Nymphomania, remarkable case of, 260

Officers, list of, xvii
Opie, Thomas, xxii
Ovariotomy, history of, on the insane, 262
reasons for drainage in, 188
Ovary, right, successful removal of a fibroma of, 151

Paine, John Fannin Young, xxii
Pelvic operations, some accidents and complications incident and subsequent to, 100
Perineum, management of, during labor, 206
Potter, William Warren, xxii
abortion, 356
remarks at close of meeting, xxxv
remarks on hysterectomy, 162
remarks on intra-pelvic inflammations, 129
remarks on influence of abdominal surgery upon general surgery, 111
remarks on accidents and complications of abdominal and pelvic operations, 109.

Pelvis, obstetric, necessity of recognizing three planes in the, 78
Peritoneal effusions after intra-peritoneal operations, 177
Porro operation, the, 378
Pregnancy, extra-uterine, 9
Premature labor, 358
Presentation, face, rectification of, 45
President's annual address, 1
Price, Joseph, xxii
remarks on influence of abdominal surgery upon general surgery, 111
remarks on accidents and complications of abdominal and pelvic operations, 112
remarks on the treatment of the ruptured parturient uterus, 35
remarks on intra-uterine amputation of the forearm, 43, 44
remarks on peritoneal effusions, 197
remarks on drainage after ovariotomy, 197
remarks on intra-pelvic inflammations, 136
remarks on hysterectomy, 159, 166
remarks on congenital sinus of urachus, 8
remarks on extra-uterine pregnancy, 17, 20
remarks on flap-splitting in perineorrhaphy, 75
the Porro operation, 378
the dry extra-peritoneal treatment of the stump in hysterectomy, 149
two cases of intra-uterine amputation of the forearm, 41
Puerperal period, sapremia and septicemia during, 312
Pyosalpinx, diagnosis of, 230

Reed, Charles Alfred Lee, xxii
remarks on treatment of ruptured uterus, 39, 40
remarks on drainage after ovariotomy, 195
remarks on hysterectomy, 155
remarks on lapara-elytrotomy, 376
treatment of the ruptured parturient uterus, 25
Rickets, E. S., drainage after ovariotomy, 199
Rohé, George Henry, xxii
Is craniotomy justifiable on living children? 351
remarks on extra-uterine pregnancy, 16
Round ligaments, observations concerning the functions of, 266

Sapremia during the puerperal period, 312
Septicemia during the puerperal period, 312
Seymour, William Wotkyns, xxii
necessity of recognizing three planes in the obstetric pelvis, 78
remarks on rectification of face presentations, 52
Shepherd, George Rubens, xxii
Sinus, congenital, of urachus, 7

Stanton, Byron, xxii
Sterility, rapid dilatation of uterine canal for, 220
Stewart, William Shaw, xxii
remarkable case of metremphysema, 220
Storrs, Melancthon, xxiii
Stump, dry, extra-peritoneal treatment of, in hystereetomy, 149
Sutures, ligatures and, 168
Suture, the animal, 279
Surgery, abdominal, influence of, upon general surgery, 92
general, influence of abdominal surgery upon, 92

Taylor, William Henry, xxiii
address on retiring from the presideney, xxxiii
annual address, 1
Townsend, Franklin, xxiii
report of ninety eases of rapid dilatation of the uterine canal for the cure of dysmenorrhea and sterility, 220

Urachus, eongenital sinus of, 7
Uterus, ruptured parturient, treatment of, 25
Umbilical hemorrhage, treatment of, 202

Vaginal hystereetomy, 140
Vander Veer, Albert, xxiii
Cesarean seetion, 373
eongenital sinus of the uraehus, 7
remarks on extra-uterine pregnancy, 14, 20
remarks on hysterectomy, 156
remarks on drainage in ovariotomy, 193
remarks on influence of abdominal surgery upon general surgery, 109
remarks on aeeidents and eomplications of abdominal and pelvie operations, 109
remarks on treatment of ruptured parturient uterus, 38
remarks on intra-uterine amputation of forearm, 42
Version, forceps and, 362

Wathen, William Hutson, xxiii
eraniotomy, 381
remarks on hysterectomy, 153, 161
remarks on extra-uterine pregnaney, 11
remarks on influence of abdominal surgery upon general surgery, 121
remarks on intra-pelvie inflammations, 135
remarks on treatment of ruptured parturient uterus, 36, 39
remarks on intra-uterine amputation of forearm, 43
remarks on flap-splitting in perineorrhaphy, 71

Wenning, William Henry, xxiii
the genu-pectoral or knee-elbow position in obstetrics. 331
Werder, Xavier Oswald, xxiii
flap-splitting in perineorrhaphy, 54
remarks on extra-uterine pregnancy, 22
remarks on treatment of ruptured parturient uterus, 37, 40
remarks on flap-splitting in perineorrhaphy, 76
West, Hamilton Atchison, xxiii
peculiarities of abortion from artificial causes. 275